COMMODORE user

Incorporating Vic Computing

Volume 1 Issue 3 December 1983 Price 85p

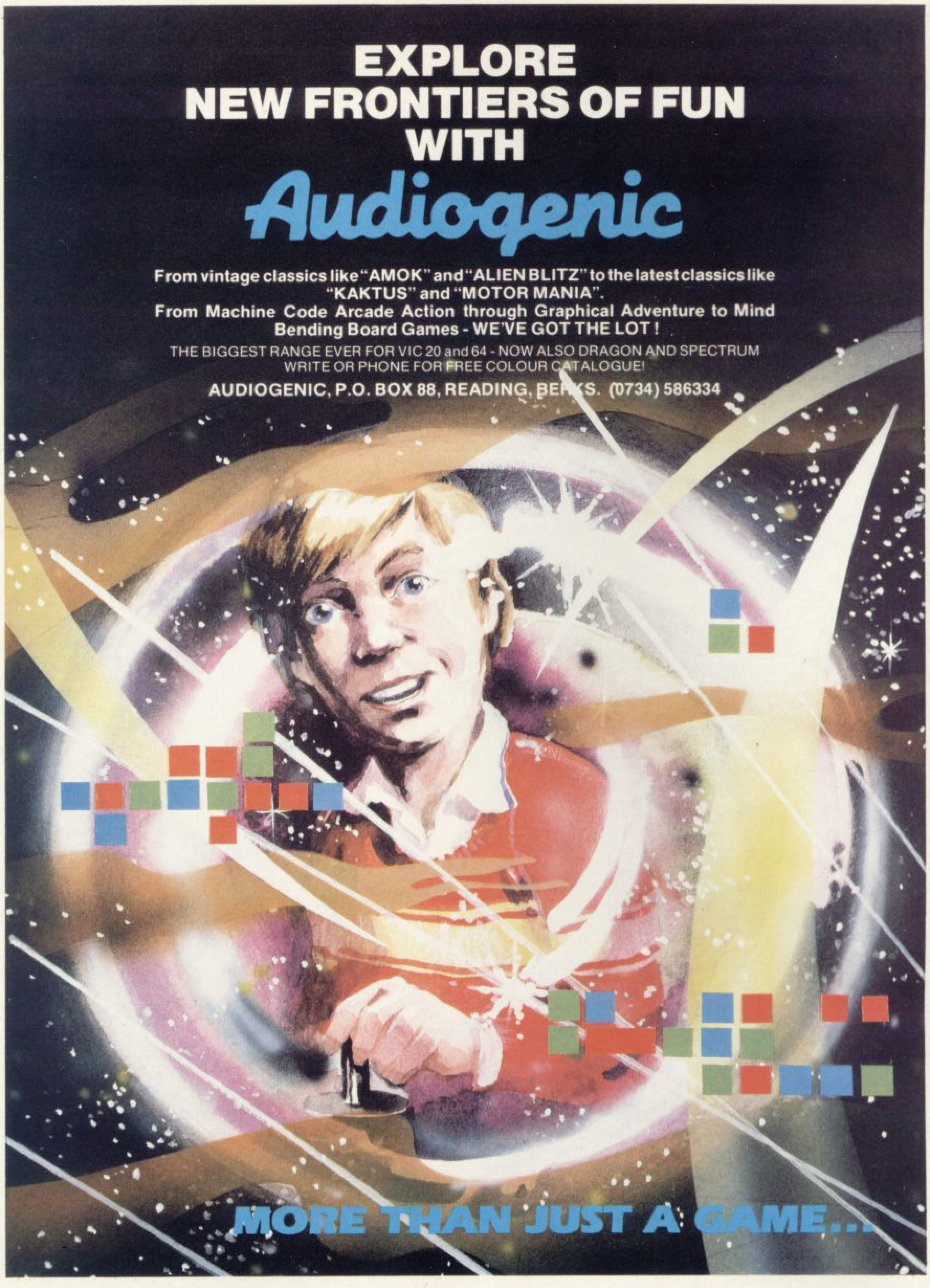
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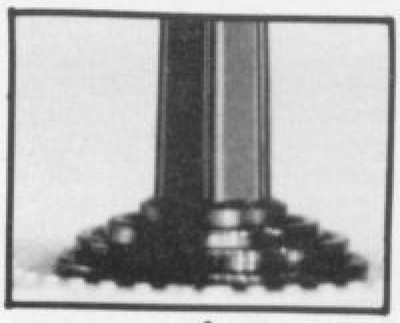

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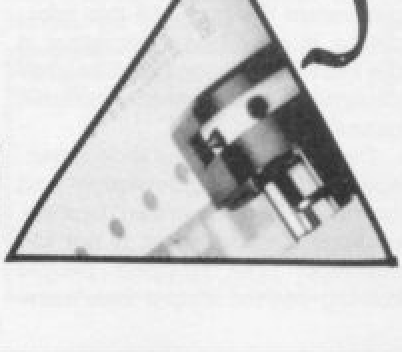












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Publisher's guarantee: There are no mistakes in this magazine except this one.

News, vendors, tone-ups, *news,* shortag

Return to Vendor

The Software Centre on London's Wigmore Street looks a Harmless enough little shop. But it recently caused a whole heap of ill-feeling in the microcomputer software business. Why? It runs a Buy'n'Try scheme.

Most of the software houses who were incensed by fears of illegal copying have now stopped sharpening their weapons: but a few – like Imagine and Bug Byte – are still chewing away at sour grapes.

The brains behind the scheme belong to Bill Cannings, a bloke who's been up and down in the computer business for years. He shot to short-lived fame and fortune with the Byte Shop Group – only to come tumbling down (losing a rumoured £86,000 on the way) before Comart bought it up three years ago. Now he's back wearing a different hat, that of the friendly neighbourhood software salesman with a soft spot for the punter. "We're trying to inspire customer confidence". he asserts.

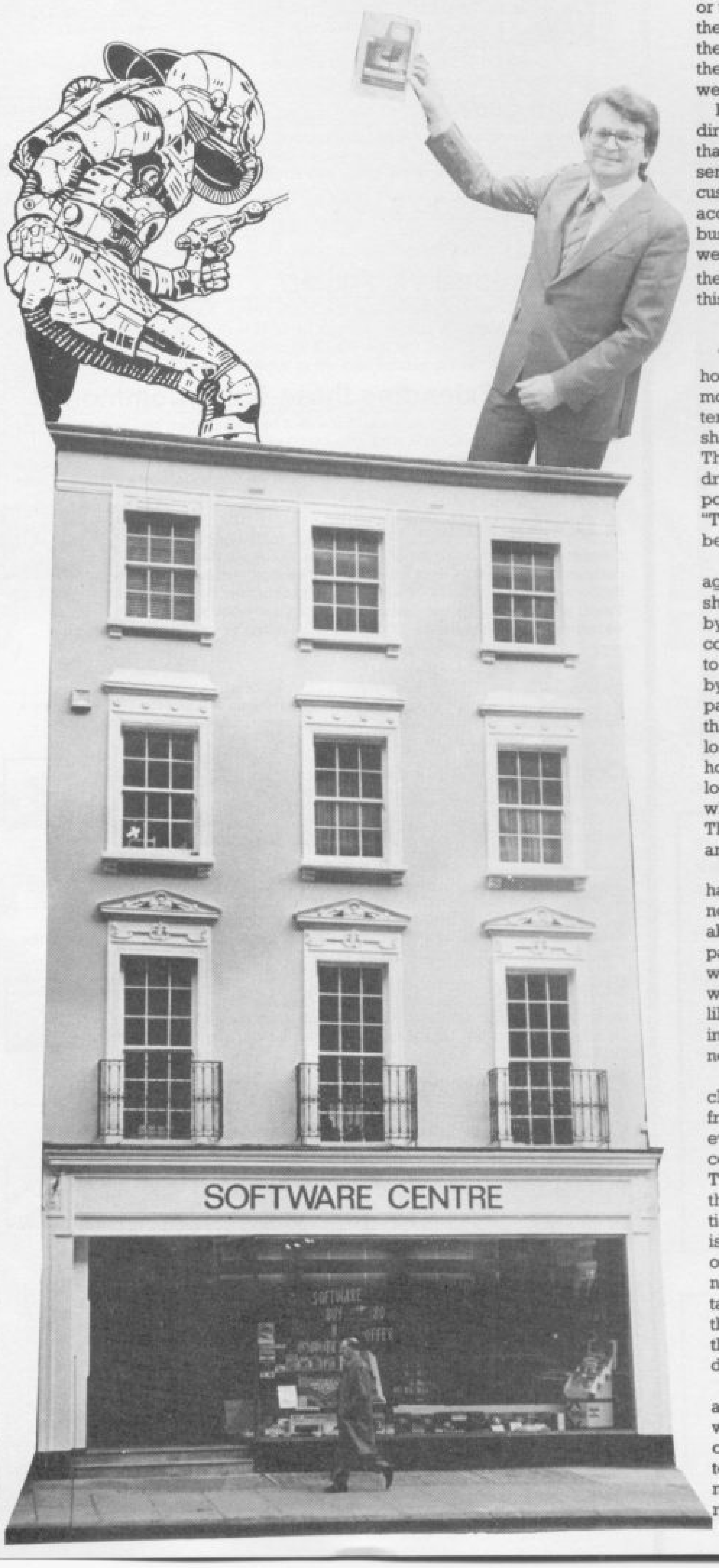
His Buy'n'Try scheme lets you exchange any software you've bought if you're not satisfied with it or it doesn't do what you'd expected. You don't get your money back, though. The Software Centre will buy it back off you for 80 per cent of the price you paid: and it's not real money – you've got to put it against another purchase of equivalent or greater value.

You don't get stung with rubbishy software, at least. But what's stopping you from copying the better games and then exchanging them? Well, not very much really ... and that's what all the fuss is about.

Bill Cannings is not unaware of this and his shop does try to do something about 'piracy'. Before you can buy anything on the scheme, you fill out a form giving your name and address and sign a declaration not to do any copying. The tape is also given a registration sticker.

If this isn't enough to make the ardent copier quiver, read on: you sign yet another declaration that you haven't copied anything when you return the tape. All this information is stored on a computer at the back of the shop (Bill Cannings designed the system himself, naturally).

David Cannings, the shop's manager and Bill's (lighterweight and sartorially less committed) brother, reckons that computer is not just cosmetic: "I've stopped people coming into the shop if their name appears too often on the computer, or they return tapes so quickly that they couldn't possibly have tried them out properly." The shop limits the return time to within four weeks, incidentally.



Imagine's disapproving financial director, Ian Hetherington, insists that Buy'n'Try is "commercial nonsense". But whatever you could accuse Bill Cannings of, you couldn't accuse him of not having a nose for business – his shops are doing very well thank you. He reckons the total will be ten by the end of this year.

The controversy with software houses came to a head a few months ago when Quicksilva entered into a court action with the shop over not wanting to supply it. The case was eventually withdrawn, though; and as Cannings points out, no damage was done – "They've now become one of our better suppliers."

Not so with Bug Byte and Imagine, who are still blacklisting the shop. Cannings isn't heartbroken by this; with his diverse business connections (you need both hands to count them) he can get supplies by less direct routes. "It doesn't particularly bother me whether they supply me or not; they're the losers in the long run. Software houses have had it too good for too long, putting out glossy adverts when the software itself is rubbish. There's just too much rubbish around."

And he believes the whole affair has now been blown up through ignorance and a general hysteria about piracy. "One or two companies didn't bother to find out what we were doing and got the wrong ideas. If we were renting, like some people say, or encouraging copying, we'd be broke by now."

Imagine's Ian Hetherington reckons Cannings' makes his money from returned tapes and that for every tape sold about five illegal copies are made by the customer. This may be difficult to prove: but the same goes for Cannings' assertion that "the number of our returns is well below five per cent and is only a very small part of the business. In any case, we're probably taking more steps to stop copying than the software houses. We're the only software seller that keeps detailed statistics of who we sell to.

We're not operating to turn tapes around because it means a lot of work feeding information into the computer. With mail-order customers we could actually be losing money on returns". And that would never do, would it?

…ges, top dogs *news.*



On the ball

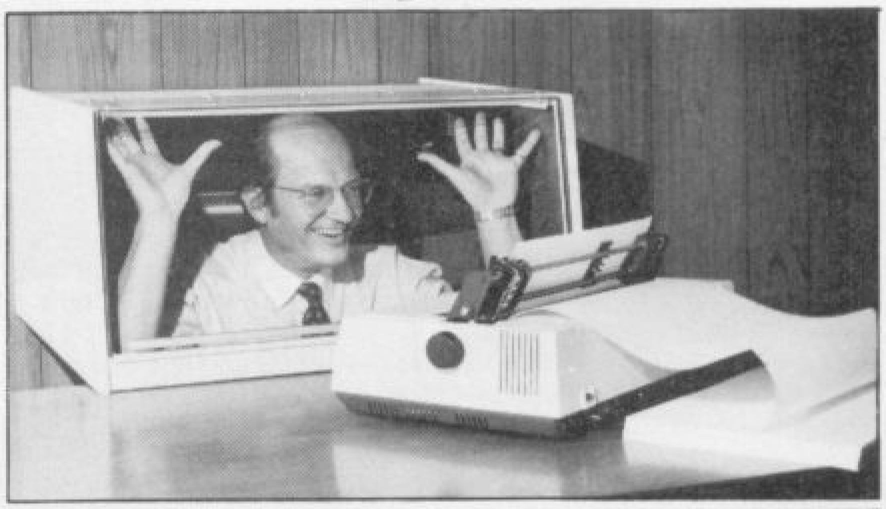
Commodore Business Machines has committed £70,000 to sponsor the English Basketball Association for a further two years. Their decision following what it calls "the company's successful involvement" with the competition during the 1982 season.

Commodore wrote a program for the EBBA which enables information about players, team performance and scoring details to appear instantly on screen during the Channel 4 transmission of games each Monday night until 5 March 1984.

Commodore's involvement in British sport sponsorship began in 1980 with the World Water Ski Championships; it's also done an indoor cricket tournament, marathon events, and the judging of the World Disco Dance Championships (true!)

Filter Fun: *Commodore has told dealers and software houses that because of the variations in SID chips it is not advisable to include the filter in the sound of commercial software. Doing so may result in "sounds that are unexpected or not audible on some 64s". There is of course, no problem in setting the filter in software you write to run on your own compuer.*

Disk switch: *If you use an uprated 1540 disk drive or the 1541 with the Vic, it may need to be switched from 64 to Vic speed. This is most easily done at the start of a program when the command channel is opened with*
OPEN 15,8,15,"UI- "





Buy BC BASIC now: *Because if you don't, you won't get it in the low-cost cassette form (RRP £19.95, though our own mail-order Deals for Readers catalogue has it at a special readers-only price of £17.95). That's because Kuma has taken up the product and will be putting it into cartridge form — easier access to the additional Basic features, but it will whop the price up to something over £40. Our review concludes that it would still be a better buy right now than SIMONS' BASIC . . .*

Turn on, tone up

Can you afford to pass up this offer? Our photograph shows Ms Denise Katnich in a characterstic pose: Ms Katnich is a "fitness personality", "a former nationally prominent gymnast" and "a specialist on employee fitness, stress management and aerobics" who was commissioned by floppy disc manufacturer Verbatim to produce 20 exercises for people who use computers.

"They can be done at an automated work station (and elsewhere too, including in front of your TV, in a matter of minutes and require no special skills or athletic abilities."

The result? You'll be more relaxed ("a relaxed person works and thinks more efficiently"), you'll have better circulation, your brain cells will get the nutrients they need (that's what it says here), and you'll be less tense.

Of course, for best results you should supplement the exercises with "a balanced programme of regular cardiovascular conditioning, muscular flexibility, strength training and sound nutrition".

Our other photograph shows a man with his head inside a silencer cabinet for printers.



The Team wishes all our readers a totally over indulged, merry and generally far out Xmas. A seasonal hic from us all. Any dinner invitations to DJ before 10.30 on the 25th

Caught short

It looks as though Commodore (and people who buy Commodore's computers) will be suffering acute shortages of its cassette recorders for the Vic and Commodore 64 this Christmas.

The buyers may be miffed: but is Commodore furious that this has occured at such a lucrative time of year? Well, no, not really; the difficulty has occured because sales of Vics and 64s have far exceeded expectations. That must be sweet news for Commodore which was reportedly expecting to scrap the Vic at the end of 1982 – perish the thought.

John Baxter, Commodore's marketing chief, told us that from July to October of this year fully 250,000 Vics and 150,000 64s have been sold. November being the most lucrative month, he's predicting sales of 100,000 64's and about 70,000 Vics – sales figures to make any marketing man reach for an even bigger cigar.

But Commodore had only 200,000 cassette machines in stock (most of them have been flown in from the US, Canada, Germany and the Far East). So there surely won't be enough to go in everyone's Christmas stocking?

Maybe not, but Commodore has thought up a way round that – for the 64 anyway. Baxter asserts that most of Commodore's marketing effort is now going into the 64. "We're doing a special offer on disk drives for the 64", he enthuses. So many 64 buyers won't (or shouldn't) be interested in the cassette unit.

The special offer means that you'll be able to buy a disk drive for £199 instead of the regular £230. Plus, you get the *Easyscript* word processing package (£75) for free – as well as six games, all on floppy disk, naturally. Looks like a neat way of getting people to spend £150 more than they originally intended; or, to take a less cynical view, it's a nice come-on to persuade us to use the 64 as a 'real' computer.

Independent option

There are alternatives to buying the Commodore cassette machine, anyhow. You could buy an interface that adapts an ordinary cassette recorder for use with the Vic or 64. One of these is the Tapeman Interface from Swanley Electronics in Kent, and we've been checking it out.

It's a rather ugly piece of work, a bare circuit board which plugs into the computer's cassette port and has two leads going to the microphone and earpiece sockets of an ordinary tape deck or portable cassette player.

At just under £10, it's cheap enough. But there is one significant disadvantage: it doesn't control the Datasette's motor. Still, Vic Edwards of Swanley told us that an enhanced version is on the way. "It will be in a casing, you'll be able to control the motor if you machine's got a Remote socket, and there'll be an LED indicator for correct volume setting." That sounds like a sensible idea; getting the level right is a very irksome job, and your tapes might not save and load until the level is spot-on.

Edwards doesn't see his Tapeman as a true alternative to Commodore's machine, though. "If you've got the money, buy Commodore. The Tapeman was developed in the first place because the Commodore machine is so expensive." Despite his modesty, demand for his little device is building up.

Other people do this kind of adapter too. Another one we've come across is Tri-Mark Electronics in Bedfordshire with the same kind of device at £15.99. Swanley is on 0322 64851, Tri-Mark's number is 0525 376600.

Print shortage

That's not the end of the Commodore shortage saga. If you were considering buying somebody one of the very neat little 1520 four-colour printer/plotters to add to a Vic or Commodore 64 this Christmas, you may well be disappointed. Commodore dealers are reporting shortages of the Commodore 1520 as well; that's a shame, since it's probably the only machine of its type and price available at the moment.

London dealer Chromasonic has been waiting for supplies for some time and suggested to us that demand is too high for Commodore's resources. But the 'shortage syndrome' is striking other people too – one of the alternatives to the 1520, the Laser 200 printer/plotter, should have been available from Computers For All stores last September and it still hasn't arrived. The company laments that the thing won't be making the trip from Hong Kong until after Christmas.

The machine is said to interface easily with the Vic and as the blurb points out, "all you have to do is to plug it in".

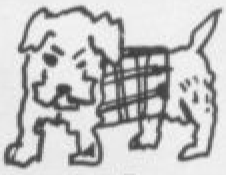
According to their respective blurbs, the two machines have remarkably similar features: both sell at around £150, both use 4.5in tally-rolls of paper and both draw a straight line at 52mm per second. The Laser's blurb includes details on resolution and quotes a figure of 0.2mm. This means that you can fill in coloured areas almost solidly.

Commodore fails to mention this important consideration in its blurb. But if you can get the manual (they're like gold dust!) you'll find the same 0.2mm figure as the Laser. They don't actually look the same – the 1520 is much neater, lighter and physically smaller in all dimensions. It's made by ALP, the same people who produce Commodore's disk drives.

We're reviewing the 1520 right now and we'll try to get our hands on the Laser PP40 when they're available (Computers For All is on 0268 418414, incidentally). But there looks to be very little differences between the two – including the fact that, at present, you can only dream of getting one.

Big stick: *The wrath of Commodore has been unleashed! The heavy mob has been mobilised in the form of an injunction against General Hardware one of several people who sell programs than can take a copy of a cartrisde. It seems a bit aggressive to single out one supplier for The Treatment, but we've been expecting something like this to happen.*

Printerface option: *As a footnote to our generally enthusiastic review of the Softex Printerface (an adapter that lets you run a cheap Sinclair ZX Printer on a Vic or 64) we've heard that Dean Electronics has droppêd the price onits Alphacom 32 to around £60. So what? Well, the Alphacom is supposed to be plug-compatible with the Sinclair printer: it's not much more expensive: andit uses much cheaper paper. We've asked for a review unit, Dean is on 0344 885661.*



Top dogs

Commodore has been given the world brand leadership for home computers costing under $1,000, by figures from US market researchers Dataquest. Dataquest claims that Commodore has 43 per cent share of the home computer market, which for machines costing under 1,000 is estimated to be worth $563 million this year. (The personal computer industry as a whole – excluding software – is forcast to be worth $20 billion by 1988.)

tops the world with regard to home computer ownership. By the end of 1982, 5.7 per cent of the population owned a computer, compared to 5.1 per cent in the USA and less than 1 per cent in France and Germany. Dataquest reckons 1.2 million home computers were around in Britain at the end of 1982, which sounds about right to us.

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Christmas Presents

by J D Collins

'Tis the season to be jolly. And to spend lots of money. Computer buffs will no doubt want to include their favourite lump of metal and plastic in the merry round. So what do you get your computer for Christmas?

The immediate answer of course is more hardware so you can run more and better software, but which bit of additional metal and plastic is going to be of most use to you at a price you can afford? Average Reader J D Collins surveys the field.

For a start, the answer to that question will depend on what you use your computer for now and what you hope to do with it in the future. Since I have acquired a fair bit of hardware in the past year I thought my opinions on each might be of help, but first I'd better say what I use my Vic for so that you'll understand my personal perspective.

Mostly I play games: and I'm not ashamed to admit it either! Then I use it to help me struggle through the ins and outs of programming; but I must also confess that I am not the world's best programmer, and I spend most of my time entering games and such from **Commodore User** *and other magazines.*

My one Great Project is to use my Vic 20 as a database system to keep my Sci-Fi library and record collection in some kind of order. Regular readers will know my progress on that line is not all it should be; but now my disk drive has returned from the pit, maybe the life style will finally come together! So let's start with the two big ones.

The Disk Drive

If you want to do your stamp collection or monitor the royalties from the games you've sold or control your corner shop, you can't get away from it: you have to have a disk drive.

You will also have to have one if you've the gift for programming: I think the delay while your baby saves and verifys and loads again will eventually do serious damage to your sanity.

So far the only option is *Commodore's* own **1541** disk unit at £229. If you can't make it tax-deductable – and that's not impossible: we've an article coming up soon on this subject – get working on the family now: any excuse will do so long as it seems serious and practical.



But be warned, it is essential that you buy from a helpful retailer since the manual has been written backwards and is an incomplete translation from the original Hebrew. If you get stuck, Commodore's telephone number is 0732 7111 – ask for technical enquiries.

Once you get one you will wonder how you managed without it!

Editor's Addition: *Partial alternative — the* **Stack** *high-speed cassette load and save gismo. It works (five to seven times acceleration!) and costs £23.00 + VAT.*

The Printer

Again if you run a business you will need one, indeed you probably have one already. And again if you are heavily into programming you will have to have one too; in fact, if you write *any* programs at all you can't beat hard copy (which is what computer people call 'paper').

If you just need program printouts then you're in luck as there are at least two printers about £100 that will do the trick; scan the computer magazines for adverts for the **Amber 2400** *(Lethaby Numbering Systems)* or the **Impact Printer** from *Computer Add Ons*, 7-9 Thane Works, Thane Villas, London N7.

There used to be a rather smart little printer, Commodore-approved, made by *Dean Electronics* at about £150: it sold in vast numbers at a computer show I went to last year, but I have not seen any sign of it since. Still, it may be worth checking out. It is called the **Alphacom 42**.

I suppose that if you want a better-quality print and easy attachment you will have to go for one of the two official *Commodore* products now selling for about £225. This will satisfy most people (except the Editor of **Commodore User**, who insists on typewriter print) and is the one I have set my sights on if I can only think of a good excuse for my bank manager. Suggestions on a postcard please.

Editor's Expansion: *See our piece in the November issue for a survey of the problems of printer attachment and what you can do about it. Chris Durham's article in October 1983 included reivews of three converter tools that should help you plug in just about any printer.*

Two other printers of note: cheapest possible option is probably the Softex **Printerface** *(includes a Sinclair ZX printer at around £72, or buy your own Sinclair for £50 and pay Softex £21.95 or so for the adapter). This is enthusiastically reviewed in this issue.*

Or pay DRG *£200+ for a straight Commodore lookalike: instant connection, maybe better availability.*

Why do I prefer typewriting? Because the Commodore 1515 won't do the 'descenders', those bits on letters that drop below the line. So our typesetters think the 'y' and 'p' and suchlike are capital letters. Lotsa hassle for all!

Memory Expansion

More memory means you can have longer and better programs. You can't expand a 64 but you will eventually move your Vic up to at least 16K of extra RAM. But if you (or the person for whom you are shopping) has only just started, a humble 3K RAM pack will double the number of programs you can use at very little cost.

The next stage up is an 8K RAM pack; but I honestly don't think it's worth it, you may as well go straight for the 16K RAM – the price differential isn't great. If you have to go through the 8K RAM stage be warned that when you move beyond 16K you may have to mess about with switches inside the RAM pack and not all non-Commodore RAM packs have the right switches. I raise this point because my own experience with non Commodore RAM packs has not been entirely happy; it seems there may be something lacking which can show up with certain peripherals like a Commodore printer.

The only one I know that seems to be all right so far is the **16K RAM** from *Stonechip* (£22.50!) because I have seen it working. I am sure the other manufacturers will be most upset by my comments: but unless **Commodore User** can offer some reassurance on this point I would stick to Commodore's own RAM packs unless money is really short. The price is starting to drop now so it's not too bad.

Editor's Reassurance: *No reassurance is possible. In general, the cheapest big-RAM packs are built down to a price — witness the abrupt departure of supplier Startech.* **Commodore** *RAMS are indeed recommended, and the price cuts are welcome (eg. 16K for £32). And not before time.*

For Your Computer

Also recommended: (with less conviction because we haven't flogged it really hard in our tests) **RAM Electronics** *— 16K for £27.95.* **Vixen** *also looks good and is fully switchable at £34.95 for 16K.*

Programmers Aids

These really help your program-writing, making it easier to key in the thing in the first place and to debug it subsequently. Some give you some extra commands too. **Commodore User** has already done a review of some of these (June 1983) for the Vic, and I have tried another one myself too. They were the tape-based **Minikit** from *Audiogenic*, cheap and cheerful (£7.95), good for a starter. **Vickit 1** from *Stack* is also pretty cheap and fairly cheerful (£23) with more commands but not fully comprehensive. *Audiogenic's* **BUTI** cartridge at £40 is pretty clever, has some helpful extras (UNNEW, hex-decimal-binary conversion etc).

But the one that topped the June 'best buy' evaluation is also the one I recommend: the *Commodore* **Programmers Aid Cartridge** is pricey at £30 or so but it's beautifully documented – and it had the one feature I wanted most, a 'CHANGE' command.

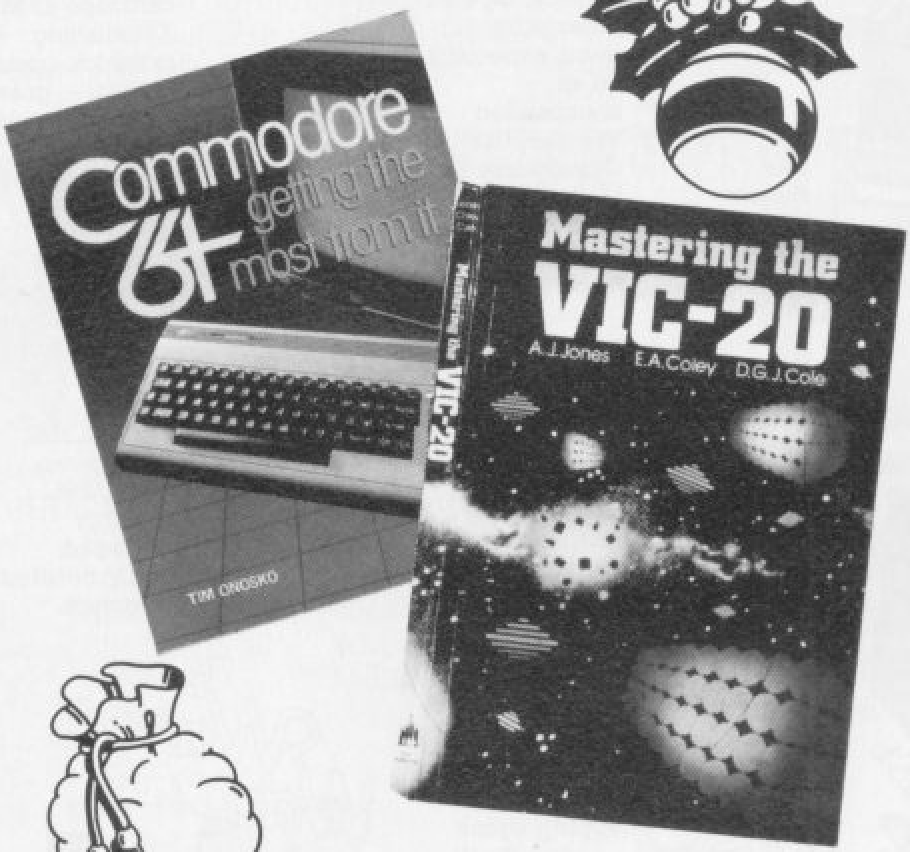
As a casual programmer I would say that the option of assigning commands to the Function keys is wasted space as the Vic or 64's own abbreviations are good enough (for me, at least). So if you too are a casual programmer, try to find a Programmers Aid utility without this feature. If you are a *frequent* programmer, on the other hand, this ability to assign commands to the function keys will be a real blessing.

The one thing that I didn't like about the Commodore product was the inability to use it at the same time as the **Super Expander**; if you are keen I'd have thought you would want both in operation together.

There's no doubt though that whichever one you get your life will suddenly become a whole lot easier. The pleasure of release from those dreary searches through a listing is pure bliss...

Best books for 64

Commodore 64 Programmer's Reference Guide	by dozens of people: published by Commodore with Prentice-Hall, £9.95. Patchy but still good.
The Working Commodore 64	by David Lawrence: published by Sunshine Books, £5.95 Good collection of routines and programs.
Commodore 64 Exposed	by Bruce Bayley: published by Melbourne House, £6.95 Terse, packed but compact collection of Useful Facts. Ok till something more intelligibly presented comes along ...
Commodore 64: getting the most from it	by Tim Onosko: published by Prentice-Hall, £7.95 Again, the best single all book currently available on the subject that we've found ... which is why we're selling it post free.



Best books for Vic

Another selection of our own reviews and preferences.

Vic-20 64 Programmer's Reference Guide	by dozens of people: published by Commodore with Prentice-Hall, £9.95. Essential reference.
Mastering the Vic 20	by A J Jones, E A Coley, D G Cole: published by Wiley, £5.95 Pot-pourri of advanced Vic ideas and explanation. Nice style, lots of meat.
Vic Graphics	by Nick Hampshire: published by Duckworths, £6.95 Best of Nick Hampshire's output to date, though its origins in a similar Sinclair book are clumsily disguised.

Editor's Addendum: *Hearty endorsement for Minikit and Commodore options depending on finances.*

Why are there no programmer's aids for the 64 yet? Nearest we get to it are the extras in Simon's Basic, which we can't yet recommend because of the bugs.

The Super Expander

To increase the power of your Vic's graphics you can get either the *Commodore* **Super Expander** cartridge or the **Vickit 3** from *Stack*. Both give you a range of extra commands and have been reviewed in more detail by **Commodore User** (October issue).

In a word, the Stack version at £23 seems to give you slightly better graphics and is slightly cheaper: the Commodore product (£31) is dearer but gives you sound commands as well – and this cartridge also has the extra 3K RAM it needs to work, the Stack version doesn't. Well, you pays your money and you takes your choice.

I got the Commodore cartridge thinking mostly that I might want to play with the Vic's sound capabilities a bit more. Although I haven't yet got down to it properly I think I should say that if you are a keen programmer then this type of thing really puts the Vic into top gear; but if like me you are still struggling through *Introduction to BASIC Part 1* maybe you should get something else instead.

I hate saying that. But what made me do so is that there are no programs readily available for the Super Expander commands; if only the software houses would publish just one or two games for this product it would be a big incentive to buy one. I suppose it is the old chicken-and-egg connundrum. Now that I have got mine does anyone know where I can get programs for it?

Editors Contribution: *No idea.*

Personal aside — super documentation on the Commodore product; brilliant for colour and graphics, helpful for joystick, less good for sound. But it still takes some getting into — after a year's use we're still not completely on top of it.

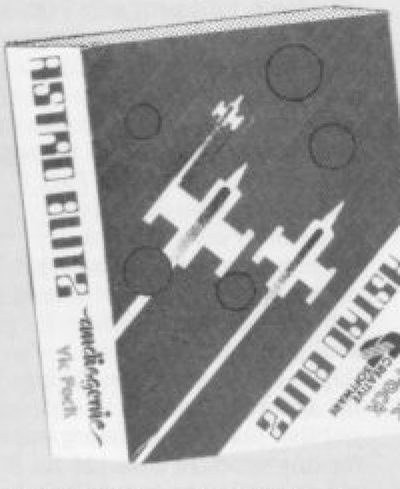
Best games

A personal selection culled from our own reviews and our reviewers' preferences. You can assume that all these imply keyboard control unless it's stated; most are available by mail order or from the larger Commodore-oriented computer shops.

Arcadia unexpanded Vic: Imagine, tape £5.50. Fantastic action version of advanced *Space Invaders*.



Adventure Land unexpanded Vic: Commodore, cartridge £9.95. Good intro to adventure gaming.



Adventure Blitz unexpanded Vic: Audiogenic, joystick, cartridge £19.95. Extended *Scramble*, excellent example of genre.

Choplifter unexpanded Vic and Commodore 64: Audiogenic, joystick, cartridge £24.95. Rescue troops with your 'copter; great graphics and sound, even on Vic.



Gridrunner unexpanded Vic and Commodore 64: Llamasoft, joystick, tape £6. Amazingly good, especially on an unexpanded Vic. Great value.

The Hobbit Commodore 64: Melbourne House, tape £14.95. The best adventure game currently available?

Hovver Bovver Commodore 64: Llamasoft, joystick, tape £6. Fun, clever, scenario (surreptiously borrow irate neighbour's lawnmower). Good dog participation.

Lazerzone Vic with 8K: Llamasoft, joystick, tape £6. Two ships to control in zapping aliens – very difficult, very clever.



Multitron unexpanded Vic: Sumlock, joystick or keys, tape £7.95. Good *Space Invaders* example, especially for sound and graphics in minimum memory.

Omega Race unexpanded Vic: Commodore, joystick, cartridge £24.95. Zap aliens from your (highly controllable) ship. Despite being very 2D, it's excellently addictive.

Soccer Commodore 64: Commodore, one or two joysticks, cartridge £9.95. Astonishing graphics, good realism – great!

Stix Commodore 64: Supersoft, joystick or keys, tape £6. Absolutely brilliant and addictive game – again despite its basic (but different!) 2D format.

Tomb of Drewan Vic with 16K: Audiogenic, tape £12.95. Superbly packaged, highly detailed adventure.



Wacky Waiters unexpanded Vic: Imagine, tape £5.50. Novel Kong-type idea, great value.

Expansion Boards

If you've got more than one cartridge on your Vic, like a memory pack *and* a game *and* a Super Expander *and* a Programmer's Aid, you'll need something that plugs into the expansion slot to have them all instantly available. An expansion board is the answer.

But this one is a bit more complicated as there are so many to choose from. Even though Commodore is now offering its own (formerly overpriced) Motherboard for £59.95 I still can't see why the extra power supply is needed unless you have the full 32K (actually only 29 and a bit) RAM expansion and a very special program that uses say the Super Expander all at the same time – and as far as I know there ain't no such beast. I am told the Vic itself will supply enough power for 32K, and most clever programs only need 16K plus the disk drive. If anyone knows why I should need that powered Motherboard will you please speak up now before I do my Vic an injury?

In the meantime I will cut through the cloud of indecision and recommend the **Expansion Board** from *Stonechip Electronics*. It has four cartridge slots and a ROM socket: and the new version is partly switchable, all for £31.95.

I settled on the Stonechip option because I had already started expanding my Vic with cartridge RAM and their product came in a pleasantly coloured plastic case; if I am going to have bits of plastic all over the place, it may as well all be colour co-ordinated. I am very pleased with it.

If money is tight you can go for the bare board types, and switches are not essential unless you spend all your time slamming your RAM packs in and out.

There is an even cheaper option and that is to go for the *Stack* **Storeboard** into which you can fix the RAM chips yourself (though it comes already with 8K on board and Stack's Vickit 3 – graphics commands plus some programmer's aid facilities – at £39). But if like me you are all thumbs then you're probably safer with the cartridge RAM type.

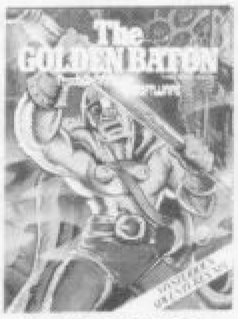
Editors Option: *Personal preference — the Stack* **Four Slot Motherboard**. *Used to need a 3K RAM from Stack just to get it to fit the slot, but no longer — goes in by itself now. Four slots, all switchable: pretty robust, cheap at £24.*

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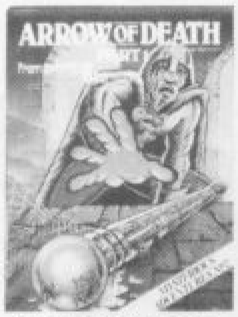
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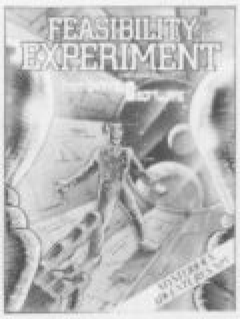
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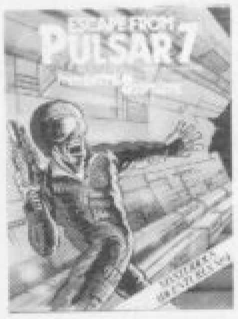
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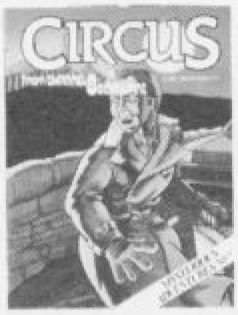
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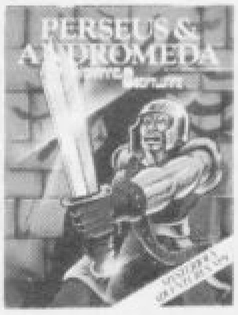
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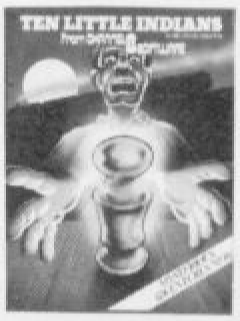
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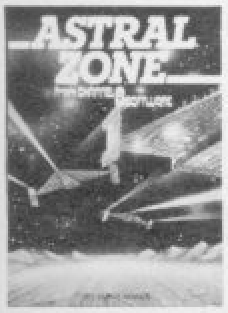
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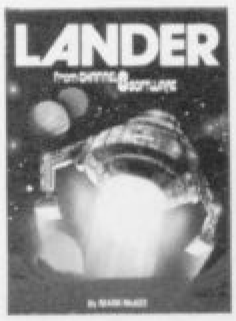


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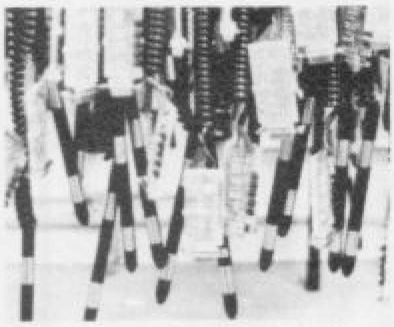
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Light Pens

Great fun and quite useful too as an option to the keyboard, especially if you're writing 'multiple-choice' programs. There are several versions coming on to the market now: so again I will just tell you about the one I got from *Stack*. At the time I bought it I could have chosen from several companies at the Commodore Show this year, but I settled on the Stack model because the girls on the Stack stall let me look with my fingers – gives you confidence if you can look inside the wrappings before you buy.

You get a free game with the light pen plus an explanation of how to calibrate the pen to your TV set and how to incorporate the light pen into your own programs. I thought this explanation could have been a bit more detailed: but if you are a half way competent programmer you won't have any problems.



If you can't tell a PEEK from a POKE, don't worry because Stack also sell a range of games programs to go with its little magic wand – very cheap at £5.00 a game.

Stack's light pen will set you back £25, much the same price as all the others.

While a light pen is a real fun piece of technology and looks ever so impressive when you are showing off to friends they do have one little catch; if you prefer your TV set's brightness turned down, you may find a light pen will not detect the pixels properly and you'll have to turn it up a bit.

Editor's Illumination: *Stack — definitely. Good alternative at more money —* **Alphatronic** *for about £29.80.*

Interesting alternative for games players — the **Stack Light Rifle** *for £29.95. See November news pages: you can stand 12ft from the screen and bang away at targets. Three free games, Stack has others at £5.00 each.*

Joysticks

Lots of games use joysticks, and they're more fun than having to pound away at the keyboard. The 'official' *Commodore* joystick at £7.50. isn't a bad buy, but you get a better 'feel' and the promise of improved reliability from some independent suppliers.

The one being hammered in the **Commodore User** office right now is from Spectravision via *Vulcan Electronics* and costs £12.95. We also like the look of the impressively cheap (£5.95) offering from *Voltmace* and the engagingly obscene-looking but very clever £20 one-handed stick from *Stonechip*.

Editor's Explanation: *I wrote this.*

The Best Thing Since Sliced Bread

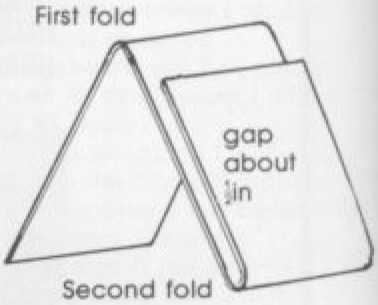
And it isn't even battery-operated!

I hope the makers are still in business because I give this thing a Gold Star award: the **Easireader** from *Bugbear* up there in South Shields.

The Easireader is two pieces of smoky perspex which slot together and support your book or magazine when you are entering a program listing. A sliding 'cursor' keeps your place in the listing thus leaving both hands and eyes free to concentrate on your keyboard. I got mine last year for about £15; and I whisper a little blessing every time I use it, honest. It will be equally useful to the Micro Freak working through that book on machine code or to someone trying out their first listing, maybe even more so. Wonderful!

Editorial Butter: *This one really is cheap. If in difficulty, you can buy similar things from office equipment shops — but they tend to be designed for single sheets (they're for typists). And* **Newscope** *has a lightweight clip-on book/paper stand for about £8.*

Alternatively, make one yourself. Buy a scrap piece of clear plastic or perspex from a DIY shop (or try under 'Plastics' in the Yellow Pages) and bend it to shape — carefully! — over a bar of heated iron. Ok, not everyone **has** *a bar of heated iron handy: so check your local skip or tip. You want to start with a sheet about 3½ft long by 1½ft wide and end up with this:*



Suppliers

Most of the products we mention are available by mail order or from the larger Commodore-oriented computer shops. If in doubt, contact the supplier direct.

Alphatronic Ltd
160 Basingstoke Road
Reading
Berks
0734 868944

Audiogenic Ltd
PO Box 88
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Nicholson Buildings
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Project

BUILD A POTENTIOMETER JOYSTICK

Do it yourself for less than £10

by Ken Ryder

The games ports on the side of the Vic and Commodore 64 are versatile. They can be connected to five switches and two potentiometers: the proprietory type joystick uses the five switches, the Commodore paddles use two switches and the potentiometers.

A switch-type joystick can only be used to specify motion laterally, vertically and at 45 degrees. But as the June issue of *Vic Computing* showed, a potentiometer joystick can be used for true proportional control. A small movement of the stick causes a small slow movement of a cursor (or gunsight, or spaceship); and a large movement can cause a hefty, rapid movement of the object. In other words a potentiometer type joystick can move an object in any direction and by a distance proportional to the movement of the stick. This does depend upon the software driving the stick, of course.

All the large potentiometer joysticks on the market seem to cost around £25. This prompted Ken Ryder to design and build his own, and it shouldn't cost more than £10 to copy.

I tried to use readily available parts where possible, and to make the construction simple without using any special tools. The main components are two 2M ohm linear potentiometers. The Vic and 64 only use the first 100K ohm of the pots, representing about 60° rotation of the shaft — which is all that is needed for joystick control. A list of all the other parts required is given in the table.

Construction

The first item required for the joystick is a suitable box to house it. The box should be about 4½in square and at least 2⅞in deep. I used an Addis Freezer Box: it is made out of a rigid but easily workable polythene (Tupperware is too flexible).

Remove the lid and cut out a ⅜in thick piece of plywood to fit tightly inside the mouth of the box. Mark out two centre-lines across the ply to locate its centre. Take one of the standard woodwork brackets; drill two of the holes in one leg and the hole in the end of the other leg to ¼in diameter. Screw the bracket to a block of wood (**Figure 1**).

Drill a ¼in hole through the block using the hole in the bracket as a guide, and drill a 3/32in hole to intersect it as shown. Position the bracket on one of the centre-lines of the plywood base half an inch from the centre of the base (**Figure 1**).

Figure 2

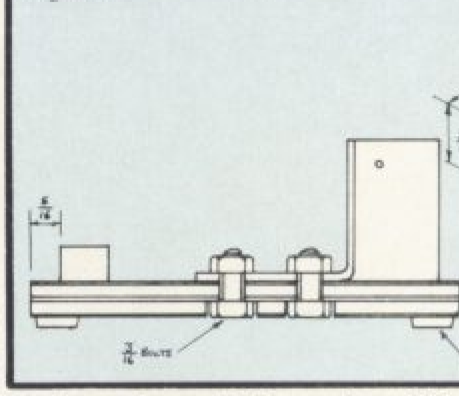
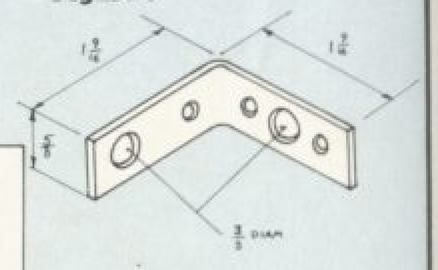


Figure 3



Mark out the two holes on the base and drill through with a ¼in drill: counterbore the holes with a ¾in drill to half the thickness of the base and bolt the bracket to the base with two 3/16in diameter bolts, so that the heads are recessed in the counterbore (**Figure 2**). Stick one of the four rubber feet in each corner of the base to prevent any scratches to furniture.

Take the second angle bracket. Drill out the hole in the end of one leg to ⅜in, and drill another ⅜in hole centrally between the holes in the other leg (**Figure 3**). Saw a screwdriver slot across the end of each potentiometer spindle; mark one pot 'X' and the other 'Y'.

Fit pot X into the hole in the end of the bracket, and pot Y into the hole in the centre of the bracket (**Figure 4**). Take care not to let the contacts on the pots touch the angle bracket. Push the spindle of pot Y into the block of wood screwed to the other bracket (as shown in **Figure 5**).

Measure the distance from the back of the block of wood to the centre of the plywood: and then measure the distance from the back of the block of wood to the centre of the pot X shaft. Subtract the first measurement from the second; this represents an offset measurement (OFF) which will be needed later.

The main handle assembly consists of another block of wood 5⅝x⅞x1⅜in drilled as shown in **Figure 6**. Cut a 2½in length from the body of a hexagonal-type ballpoint pen and remove a small section at the bottom (figure 7). Push-fit the Biro into hole 'A' of the block with the removed section facing hole 'C'.

For the top of the handle, use the handgrip from Black & Decker electric drill. Enlarge the hole in the end of the handle to 5/16in wide to a depth of about 5/16in and push it on to the end of the Biro (**Figure 8**). Push the whole assembly on to the shaft of pot X (**Figure 9**); and screw a six-way 'chocolate block' connector to the base in the position shown in **Figure 1**.

The main cost is the nine-pin plug and cable required to connect the stick to the computer. I used a D-plug and cover (available from Maplin and elsewhere) and a one-metre length of ten-strand ribbon cable (only nine of the

Figure 1

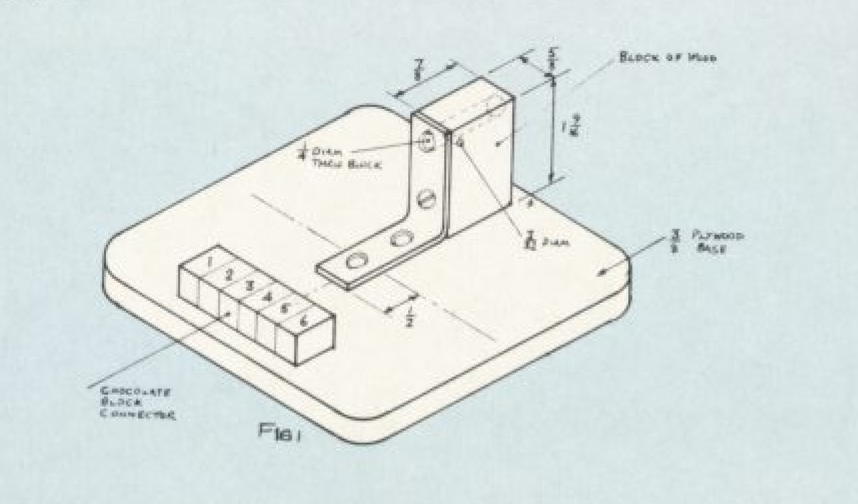
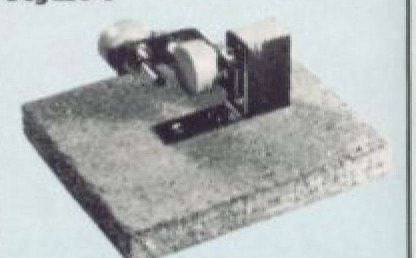


Figure 4



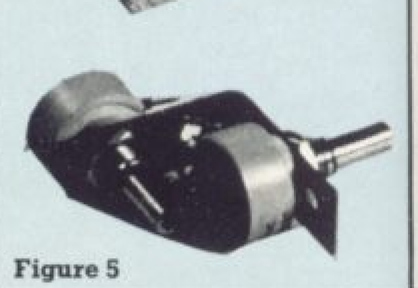


Figure 5

Figure 6

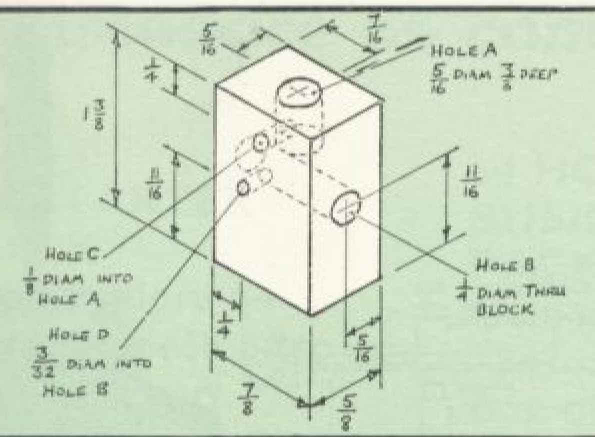


Figure 10

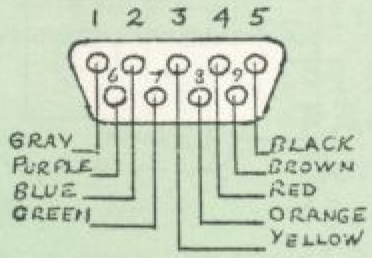


Figure 11

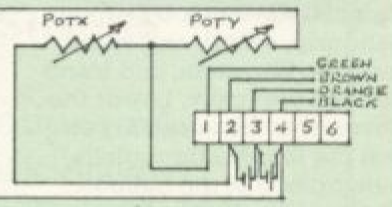
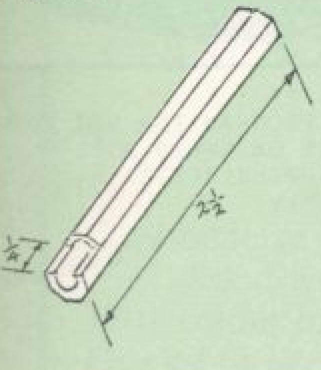


Figure 7



wires are required for the project).

Solder the cable to the plug (as shown in **Figure 10**) and fit the cover. At the other end of the cable separate the ribbon into individual strands for a length of about eight inches. Connect the wiring and capacitors as in **Figure 11**: ensure that sufficient slack is left in wiring connected to moving parts such as the potentiometers themselves.

Start typing

Now you can type in the programs. If you have a 64, enter **Program 1**: if it's a Vic, use **Program 2**. Plug the joystick into port 1, then RUN the program.

Hold the joystick so that the handle is vertical. Using the screwdriver slots in the end of the potentiometers, adjust the resistance until the values displayed are fairly steady around 128; screw small self-tapping screws into the 3/32in diameter holes in the wood blocks to hold the shafts firmly. Be careful not to overtighten the screws and strip the threads in the wood.

Disconnect the ribbon cable from the chocolate block. Put two strips of masking tape across the approximate centreline of the freezer box, and mark out the exact centrelines in pencil on the tape to locate the centre of the box.

On one of the lines mark a point at a distance equal to OFF from the centre. Mark out a two-inch square centred on this point and carefully cut it out with a Stanley knife. Drill a ⅜in hole as shown, and fit a rubber grommet into it (**Figure 12**).

Fold and push the ribbon cable through the grommet into the box. Lower the base over the handle, reconnect the wiring, and fit the box on to the base. Secure it to the base with four small self-tappers in each side of the box.

Plug the joystick into the port and RUN program 1 again. Hold the box as in **Figure 13** and push the stick forward: the value of pot Y should be 0. Pull the stick back and the value should be 255; move the stick fully left and the X value should be 0, with X=255 when it is moved fully right.

If these values cannot be reached, trim the hole in the box accordingly. If the values are reversed, reconnect the wires to the free terminal left on the potentiometer.

The switches

The next section deals with the five switches that can be used by the port.

One obvious position for a switch is on the top of the handle. Position one of the red switches in the centre of the top of a pill box — the one that I used was a tight push-fit on to the top of the handle (**Figure 8**).

The other four switches are positioned on the top left hand side of the box (**Figure 13**). Again use a piece of masking tape along the approximate centreline of the switches. Mark the exact centre ¾in from the left-hand edge of the square hole; drill and fit each switch at the positions shown in **Figure 13**. Connect the wiring as in **Figure 14**. Leave enough spare length on the common ground so that the cover can easily be removed.

Thread two wires from the switch in the handle through the handle, the Biro and the block of wood: again leave enough slack to allow for movement of the joystick.

The more observant will realise that there is still a two-inch square hole open to the elements — enter the balloon.

Take the lid off again and stick some double-sided Sellotape around the square hole on the inside of the box. Blow the balloon up and let it down again — this stretches it — then blow the balloon up again to about 3in diameter. Position it so that the mouthpiece is in the centre of the square hole, and push the balloon firmly against the sticky tape. Deflate the balloon slightly and push it around so that it contacts all the tape.

Now let the balloon down completely, trim around the edge with a Stanley knife, and remove the inner skin of the balloon. The mouthpiece of the balloon should now be in

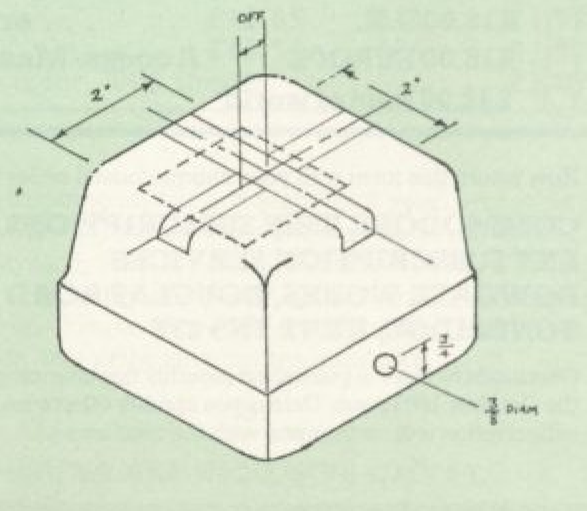
Figure 8



Figure 9



Figure 12

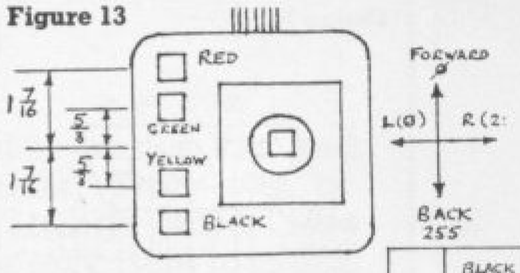


the centre of the square hole, surrounded by a taut skin of rubber.

Remove the Black & Decker handgrip, switch and wiring from the Biro stem; and stand the Biro vertically. Lower the cover over the assembly so that the Biro fits through the mouthpiece of the balloon. Replace the B&D handle, reconnect all the wiring and screw the box to the base. Stretch the mouthpiece of the balloon around the bottom of the handle to make a tight dustproof joint (**Figure 15**). The tension of the rubber also tends to act like a spring return to keep the stick upright when not in use.

(I must admit — although it grieves me to do so — that the balloon was not my idea: it was the inspiration of Max Dutton, a colleague at work, and I promised him a mention for this stroke of genius.)

Figure 13



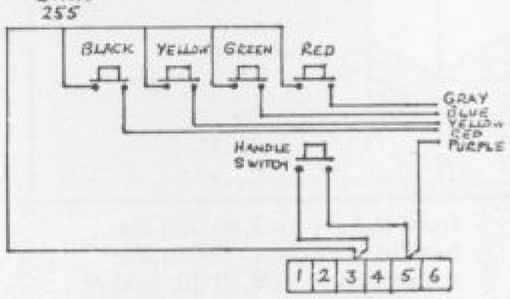


Figure 14

Figure 15



```
5 REM ** PROGRAM 1 **
10 REM **JOYSTICK PROGRAM FOR 64**
20 REM ** READ POTS ON PORT1 **
50 X=PEEK(54297):Y=PEEK(54298)
70 PRINT"X",X,"Y",Y
80 GOTO50

READY.


SEARCHING FOR JOY2
```

```
5 REM ** PROGRAM 2 **
10 REM **JOYSTICK PROGRAM FOR VIC 20 **
20 REM ** READ POTS ON GAMES PORT **
50 X=PEEK(36872):Y=PEEK(36873)
70 PRINT"X ";X,"Y ";Y
80 GOTO50

READY.
```

Parts List

Quantity	Description	Cost
1	Addis Box	.80
2	2M ohm pots	.80
2	Brackets	.35
4	Rubber Feet	.18
2	Capacitors 1000pF	.05
5	Push buttons	3.85
1	Balloon	.03
1	D plug	.40
1	D cover	.95
1 metre	Cable	.60
1	Black & Decker handle	.00
1	Connector (six way)	.30
	Total	**£10.31**

The stick is now finished. Enter **Program 3** into your 64 or **Program 4** into a Vic to test out the action of the stick and the switches.

You will notice that the value of the potentiometer jitters slightly even when the stick is stationary; this is because of general background 'noise' and temperature effects. A way of overcoming this is to use a machine-code routine to read the potentiometer registers instead of Basic, but that requires another article!

```
10 REM ** PROGRAM 3 **
20 REM ** TEST FOR COMMODORE 64 **
30 REM ** SET UP DDR FOR PORT1  **
60 REM ** READ POT REGISTERS **
70 X=PEEK(54297):Y=PEEK(54298)
80 PRINT"X ";X;"  Y";Y
90 REM ** READ SWITCH REGISTER **
100 SW=PEEK(56321)
110 IF(SWAND16)=0THENPRINTTAB(20)"FIRE BUTTON"
120 IF(SWAND1)=0THENPRINTTAB(20)"RED BUTTON"
130 IF(SWAND2)=0THENPRINTTAB(20)"GREEN BUTTON"
140 IF(SWAND4)=0THENPRINTTAB(20)"YELLOW BUTTON"
150 IF(SWAND8)=0THENPRINTTAB(20)"BLACK BUTTON"
200 GOTO70

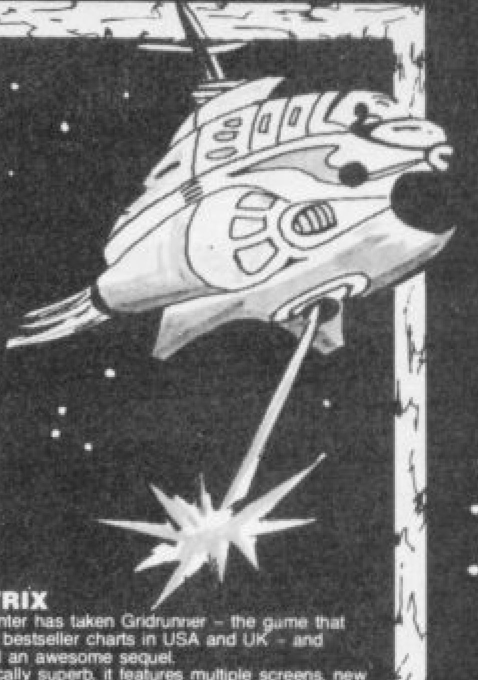
10 REM ** PROGRAM 4 **
20 REM ** TEST FOR VIC 20 **
30 REM ** SET UP DDR FOR PORT1  **
40 DA=PEEK(37139):DE=PEEK(37154)
50 POKE37139,0:POKE37154,127
60 REM ** READ POT REGISTERS **
70 X=PEEK(36872):Y=PEEK(36873)
80 PRINT"X";X;"Y";Y
90 REM ** READ SWITCH REGISTER **
100 SW=PEEK(37137)
105 REM ** SWITCH ON TOP OF STICK **
110 IF(SWAND32)=0THENPRINTTAB(12)"FIRE"
115 REM ** SWITCHES ON TOP OFF BOX **
120 IF(SWAND4)=0THENPRINTTAB(12)"RED"
130 IF(SWAND8)=0THENPRINTTAB(12)"GREEN"
140 IF(SWAND16)=0THENPRINTTAB(12)"YELLOW"
142 REM ** READ SWITCH REGISTER **
145 SW=PEEK(37152)
150 IF(SWAND128)=0THENPRINTTAB(12)"BLACK"
200 POKE37139,DA:POKE37154,DE:GOTO50
```



METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME

A fast and original game for the unexpanded VIC. Challenging and colourful, with good sonics and a unique game action and design, this promises to be the most exciting new 3.5K VIC game since the introduction of GRIDRUNNER nearly a year ago. **£5.50**





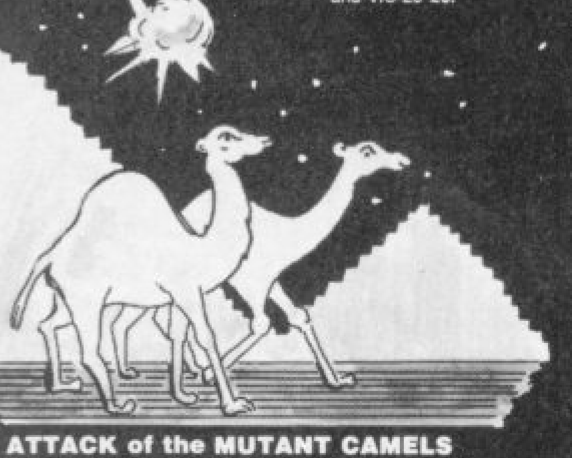
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Available for Commodore 64 **£7.50** and VIC-20 **£6.**

MATRIX

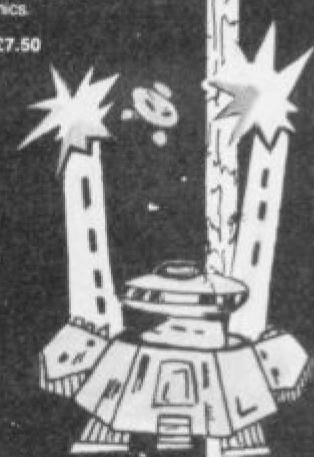
Jeff Minter has taken Gridrunner – the game that topped bestseller charts in USA and UK – and created an awesome sequel.
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Packed into 20 mind-zapping zones and accompanied by incredible sonics.
8K expansion required.
Available for Commodore 64 **£7.50** and VIC-20 **£6.**



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A totally original arcade game for C64 featuring outstanding graphics and a sound track created by a professional Piano Wizard. Gordon Bennet has borrowed his neighbour's Air-Mo-lawnmower. Mow your way through as many of the 16 lawns as you can before the pursuing neighbour retrieves his mower. Set your dog onto the neighbour to help you out of tight spots and don't annoy the gardener. Try not to plough through the neat flower beds or overheat your mower! **£7.50**





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GRIDRUNNER

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llamasoft

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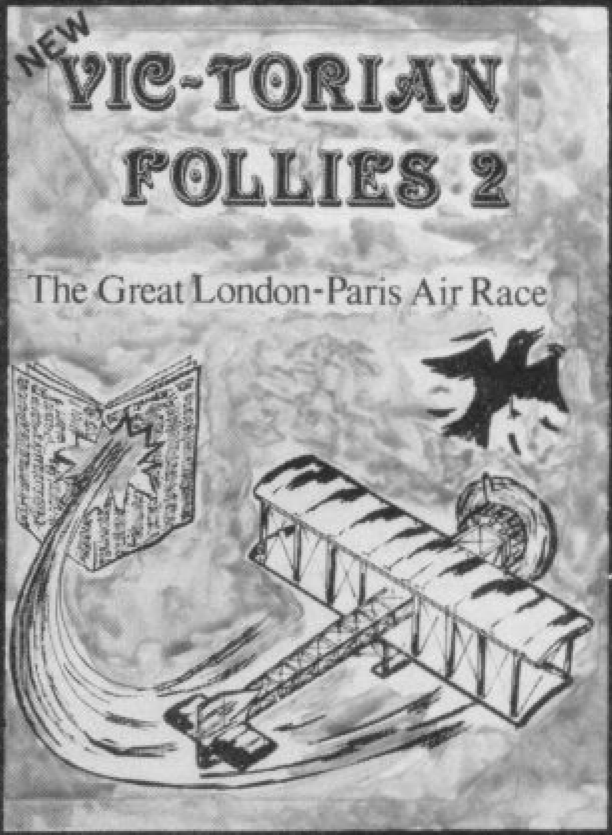
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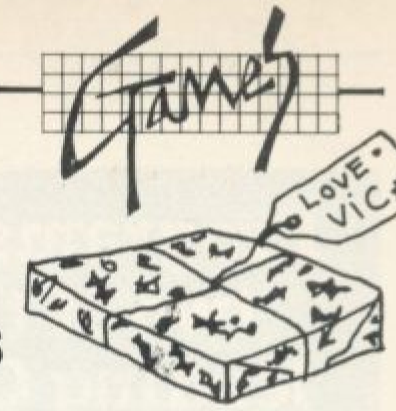
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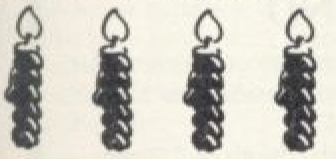
Screen scene

Our regular round-up of games reviews

We get to see a lot of games here at Commodore User, so many in fact that we can't handle all the reviewing ourselves – we farm out some of them, which is why our reviews have someone's initials at the end of them. We look at everything we get, but we don't necessarily print all the reviews we write: instead, we tend to stick with (a) all the best games we come across and (b) those games that you're most likely to find in the shops or the mail order ads.

How do we assess them? Well, basically we just play the games. Which may sound obvious, except that all the reviewers have seen so *many* games that they can apply a bit of comparitive experience to the evaluation.

We rate games out of five for each of four criteria. *Presentation* means how well the thing is packaged and how good it looks on the screen: dull graphics and poor sound get marked down here. *Skill level* refers to how much skill (of whatever kind) is required to play the game – so if pure chance is involved, the game gets a low mark. (But don't dismiss it on that: some 'chance' games are great fun.) *Interest* is an answer to how well the game did at maintaining the reviewer's interest in it. And *Value for Money* is obvious enough: it's our overall conclusion about how it compares with other games and whether we'd buy it ourselves.



ADVENTURE LAND
Commodore cartridge keyboard
Price £9.95

If you have hesitated before, now is the time to rush out and buy your first Scott Adams adventure cartridge at the new low price. Try to pick one nearest to your own fantasies so you feel at home to start with; I am told that *Mission Impossible* is just that so maybe if you're a novice you should avoid that one. Anything with Dragons in it is right by me, so I got this one – just before all these other games arrived so I haven't got very far yet.

All Commodore adventure games have a 'save game' facility so I will have plenty of time to work out whether it is better to let sleeping Dragons lie or to try the rusty magic sword in the hope that a dead Dragon will give up a treasure or two. Decisions, decisions! Adventure gaming seems to be a solitary thing but I don't see why the whole family can't get their heads together over a dungeon or two, just think of the arguments you could all have!

Don't forget the large sheet of paper for your map ... *JDC*

Presentation:	■■■■■
Skill level:	■■■■□
Interest:	■■■■■
Value for money:	■■■■■

AVENGER
Commodore cartridge: joystick or keyboard
Price £99.95

Commodore's cartridges are now a much better buy as the price has plummeted to what I call a reasonable level – though I notice some shops are still asking a much higher price. *Avenger* is a classic 'space invader' game with little to distinguish it from other versions unless you happen to take a liking to the shapes of *Avenger's* aliens. The black background makes the graphics a bit murky but you can always give the brightness control on your TV set a twist.

As always with Commodore products the packaging is superb; and I can't fault the strength of the program itself, it does everything you would expect. If you *must* have an Invaders style game on a silicon chip then at this price you can't grumble. *JDC*

Presentation:	■■■■■
Skill level:	■■■■□
Interest:	■■■□□
Value for money:	■■■■□

BATTLE OF BRITAIN
16K+ Vic: keyboard only
Price £9.50

I am not sure how you describe this type of game. It's a cross between a non-graphic Adventure and a 'war game'. A simulation? Maybe. Anyway you are the British War Minister in charge of the nation's production of war materials and also air defences; so you have to decide how to distribute your limited number of squadrons to defend your cities, and you must also decide how to make the best use of your production of steel and planes and such.

You can set your own level of difficulty by choosing how many German bombers and fighters there are in each game.

I have to confess that I found the World War II scenario totally boring so you must judge my comments accordingly! If you like to set up historic battles with model soldiers, or if you hanker after a Junkers or a Spitfire, or if the spirit of The Few stirs your blood, then this is the game for you. I do not know of any other such simulation-type game for the Vic so maybe you should try it out.

One reason why I found it so hard to get into was that the instructions on the cassette sleeve didn't seem to correspond to what happened on occasion, but that could have been me being stupid. *JDC*

Maincomp Ltd, 1-2 Cambridge Gate, London NW1 4IN.

Presentation:	■■■□□
Skill level:	■■■■□
Interest:	■■■□□
Value for money:	■■■□□

FRANTIC
Any Vic: Joystick or keyboard
Price £5.50 (*but see review*)

This too arrived without instructions and the game was too complex to work out without help, but knowing how friendly Imagine are I gave them a call to ask for the cassette cover. I was told that they are withdrawing *Frantic* from sale because of their policy of only having a few games on sale at one time. This being the case I suggest you scout around to see if you can find a copy gathering dust on a shelf somewhere. If I can't find one I'm going to raid the offices of **Commodore User** to get this review copy back!

You are a lone Space Miner drifting down the gravity well of the giant planet Spectrum (pardon?) hoping to get at the precious minerals in the core of the planet and its moons. You have only your laser and antigravity pack to help you. The local life forms naturally resent your presence and are prone to zoom in to attack.

The display of course is up to Imagine's usual excellent and highly original standards; movement through space is simulated by a kind of moving texture gradient which is so effective it nearly gave me motion sickness. Your position and that of your targets is shown by a horizontal and vertical radar display, and the laser zaps and such really smack the retina.

Be warned though, it is a very hard game to play for high scores.

Imagine Software, 5 Sir Thomas St. Liverpool, L1 6BW.

Presentation:	■■■■□
Skill level:	■■■■■
Interest:	■■■■□
Value for money:	■■■■■

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AUTO: DEL: DUMP: FIX and PT: OFF: RENUM: TRACE: SHY: EXEC: TEST: BACK:
MOREPOWER contains many fancy disk commands such as:-
DEVICE: DISC: ERR: LIST: MERGE: RUN: LOAD: START: SIZE: TEXT: UNDO: HEX: KEY:
The built-in function keys on the 64 are given special definitions when used with **MOREPOWER.** f2 gives a disk directory, f4 prints the disk error channel and f8 prints the LOAD keyword and the return. The f6 key puts on AUTO mode after reading the bottom line number of the screen.

PAL

PAL stands for Personal Assembly Language. It is a program that takes a program written in symbolic format and converts it to machine code that the 6500 microprocessor in the Commodore 64 or 8000 can execute.
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GRIDRUNNER
Unexpanded Vic: Joystick
Price £5.00

Every now and then our crafty Editor tries to catch me out by giving me a game with no instructions or anything; this was one of those. The game is so good however that it virtually seduces you into playing it without any need for mere words. I resisted giving it top marks because I had to save something for its big brother reviewed later on ...

On your screen is displayed The Grid which has been invaded by zippy centipedal Droids and their cronies the Zappers which project mutating Pods onto the intersections of your Grid. You, the lone Gridrunner, must laser the Droids and the Pods whilst avoiding the projection beams of the Zappers, before the Droids finally zip their way down the Grid and destroy you.

Not an easy task, I can tell you. You can move your Gridrunner horizontally; and halfway vertically, too, but no higher. Extremely fast action, good sonics and super graphics which become really wild as the game hots up. The way the graphics move makes it a visual treat even for a beginner. I found the sonics had a creepy metallic quality which all true aliens must possess. Yummy! *JDC*

Llamasoft, 49 Mount Pleasant, Tadley, Hants. RG26 6BN.

Presentation:	■■■□□
Skill level:	■■■■□
Interest:	■■■■□
Value for money:	■■■■■



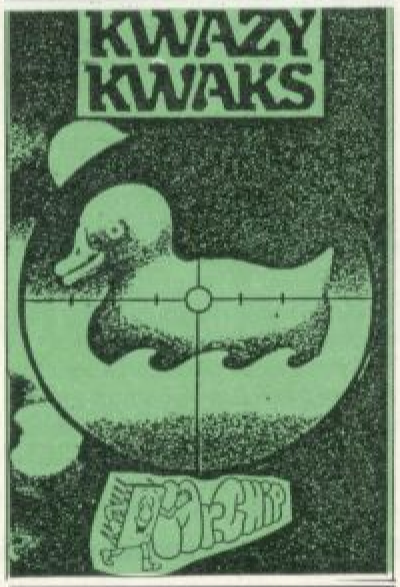
JACKPOT
Unexpanded Vic: keyboard only
Price £5.50

This fruit machine simulation is the best of the programs I got from Mr. Chip. The graphics are very clear and realistic and the overall screen presentation very interesting. It has most of the features of the real thing, such as Hold, Nudge, Respin.

I liked it – except for two things. I found the white background a bit hard on the eyes after half an hour or so, and I thought the instructions were not as clear as they should have been; a novice at the game could waste a lot of time working out how all the features are operated. No problems if you play this sort of thing regularly though. *JDC*

Mr. Chip, 1 Neville Place, Llandudno, LL30 3BL.

Presentation:	■■□□□
Skill level:	■■■□□
Interest:	■■■□□
Value for money:	■■■□□



KWAZY KWAKS
Unexpanded Vic: Joystick or keyboard
Price £5.50

Fairground shooting gallery scenario, loads in two parts so I thought it was a rather messy loader – I like to run off and freshen my glass whilst the program loads itself! The sonics are only moderate, and you get a fairground tune repeated through the game – but you can switch it off and just listen to the shooting noises. The graphics are clear (but not very clever); the scoring is also clearly presented.

My opinion? Not as imaginative as *Quackers* from Rabbit Software. *JDC*

Mr. Chip, 1 Neville Place, Llandudno, LL30 3BL.

Presentation:	■■□□□
Skill level:	■■■□□
Interest:	■■□□□
Value for money:	■■□□□

MINI ROULETTE/PONTOON/JACKPOT
Unexpanded Vic: keyboard only
Price £5.50

Three games are on one tape, all incorporated in one program. The rules of each game are explained in the first part of the program. The three games are all guessing games with playing cards, (even *Mini Roulette*). The graphic display of the cards is very clear but not very clever, and I found the whole set a bit uninspiring. You could add spice by playing for real money: but I don't want to encourage gambling and anyway playing these rather simple games with a computer is just not very exciting ... *JDC*

Mr. Chip, 1 Neville Place, Llandudno, LL30 3BL

Presentation:	■■□□□
Skill level:	■■□□□
Interest:	■□□□□
Value for money:	■■□□□



LAZERZONE
8K+ Vic: joystick only
Price £6.00

Flash! Bang! Whallop! What a picture! You are the Zone Gunner protecting the Laserzone from attack by those ever present Aliens, your only defence being two plasma cannons which move along the horizontal and vertical axis. You can also fire diagonally, but this is a tricky skill to perfect.

A training mode is thoughtfully provided; I strongly advise you to use it before getting into the main game. Controlling your Plasma Cannon properly is a real art!

The black background may cause a lack of definition on some T.V. sets but the graphic complexity as the game hots up is brilliant, Aliens and Plasma bolts and space debris go flying all over the show, great! The sonics too are just right, having the sinister metallic sound that only Llamasoft seems to be able to reproduce. This is what your 16K RAM is for. 31 levels of difficulty? I can't cope. *JDC*

Llamasoft, 49 Mount Pleasant, Tadley, Hants. RG2 6BN.

Presentation:	■■■■□
Skill level:	■■■■■
Interest:	■■■■■
Value for money:	■■■■■

PACMANIA
3K Vic: keyboard only
Price £5.50

Although for keyboard only, this program cleverly allows you to select your own keys to play by: what a good idea! The main strength of this version of the classic lies not in a wealth of exotic fruits and suchlike normally found within these walls, but in the way you can make life incredibly difficult for yourself by choosing skill level, speed, size of maze, visible or invisible walls, and moving or stationary power pills. Graphics are clear but in no way unusual, and the sonics are only average. I didn't like the stark white background either, but that's just my prejudice showing.

If you are a Pacman freak then you might try your skills against all these features. But for most players I think it will prove a bit unexciting visually, however hard it is to play.

Mr. Chip, 1 Neville Place, Llandudno, LL30 3BL.

Presentation:	■■□□□
Skill level:	■■■■□
Interest:	■■■□□
Value for money:	■■■□□



PINBALL WIZARD
Unexpanded Vic: keyboard only
Price £7.95

Although on the face of it this didn't seem such an exciting game, I was surprised to discover I had been playing the thing for ages and I only came up for air when my flipper finger needed an Elastoplast. This caused me to re-evalute my thoughts and work out why I kept on playing. I think it is the frustration of watching the ball slide smugly down the hole leaving you determined to have just *one* more go!

Details. You get a superbly-packaged cassette and a clear but not very complicated display of a pinball table. The good part

is that the motion of the ball is so cunningly recreated that its speed and deflection about the board need careful judgement to get the timing of the flipper right. The ball moves as if under the influence of gravity thus slowing down and speeding up in a very tricky manner.

The more I played the more I liked it. I especially liked the way you could enjoy it at a beginners level or as an expert. The 'hook' never looses its bite seeing your ball roll past your furious flipper. *JDC*

Terminal Software, 28 Church Lane, Prestwich, Manchester, M25 5AJ.

Presentation:	■■■■□
Skill level:	■■■□□
Interest:	■■■■□
Value for money:	■■■■□

SUPER SCREEN
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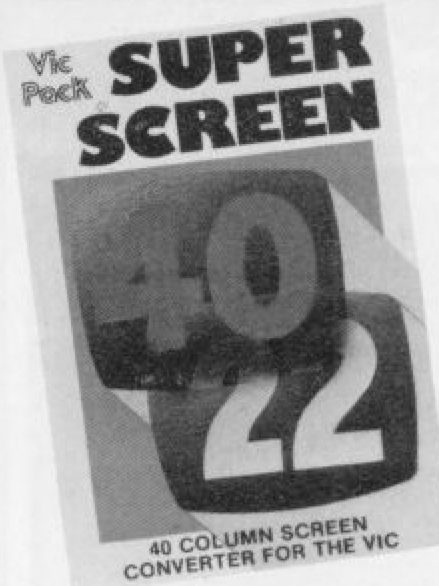
This fun little program has been reviewed already in **Commodore User** (November 1983) but a second opinion helps. It converts the Vic 20 to a 40-column screen thus unleashing the power of your Vic for pages and pages of tiny words just like grown-up computers.

Excuse my scepticism. I confess I actually prefer the size of the Vic's lettering; and I positively dislike the clarity of those 40-column letters – some are very hard to read and certain combinations look like ink blots. I had to turn the colour off completely before I could read the screen, but as you might see for yourself this won't make much difference. For the extra columns you lose the ability to POKE to the screen and colour memories, and this probably explains why I could not use my word processor program with this program in operation. You also lose out on some of the Commodore Programmer's Aid cartridge facilities such as SCROLL, STEP and TRACE ... at which point I lost interest.

Still, if you're an ace programmer you could still make use of the extra columns. Well, maybe. *JDC*

Audiogenic, P.O. Box 88, Reading, Berks.

Presentation:	■■■□□
Skill level:	n/a
Interest:	■■■□□
Value for money:	■■□□□



VIC TAPE BACK UP
Any Vic
Price £7.95

This is it. The end of copyright laws as we know them. Well, not really. I had the odd pang of conscience as I loaded this program; but I decided to reveal all, mainly because it is not so brilliant that you can forget about ever buying any software again.

If you are so paranoid about losing your favourite program or fear the playful attentions of the family cat amongst your cassettes, you will no doubt get one of these whatever I say. But you can forget about going into the software piracy business.

For a start it is quite fiddly to use; in, out, shake it all about, I began to lose track of what I was copying on to which cassette and whether I had done it already. That is an exaggeration, but you (probably) know what I mean. It gets a bit much if you are trying to copy a program that loads in more than one stage. Maybe my irritation arose from trying it out on too many programs at one go, but I didn't have all the year to test it so I worked through nearly all my cassettes at one go.

This brings out another sad fact, Sod's Law applies here: the very programs you most wish to preserve are going to be the very ones that this program cannot copy. It won't copy on to disk either, so that meant that I couldn't make any time savings on my 16K programs which take so long to load from cassette. My advice? Spend your schekels on something else unless this is absolutely essential. *JDC*

Level Software Ltd, P.O. Box 55, Shirley, Solihull, B90 4SL.

Presentation:	■■■□□
Skill level:	n/a
Interest:	n/a
Value for money:	■■□□□

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Todd's Lore

These delightful characters

There are three ways of getting characters on to the screen of the Vic-20 or Commodore 64. You can print them as character strings, you can print the CHR$ values of the characters, or you can POKE the character straight into the screen memory (not forgetting to POKE the colour memory at the same time.)

There are also two modes of display, graphics mode and text mode. The Vic powers up in graphics mode with capital letters being produced unless the shift key is used, in which case we get graphics characters.

In text mode, the normal character is the lower case letter and shift produces the capital, just like a typewriter. But, whether you are in text or graphics mode, the characters in the screen memory remain the same, it is the character generator that is switched.

Although Basic normally uses capital letters in programs, it is actually unshifted letters which must be used – which explains why, in text mode, capital letters (which are shifted) do not work.

For this month's Lore I have produced these four tables of characters for your delight, delectation and reference.

The first two tables show the complete character sets and their screen POKE values in both modes. The small numbers under the characters show the actual decimal POKE values; the column/row numbers could be used to find the hex codes if needed.

The other two tables show the same character sets as they appear when used with the CHR$ command – thus PRINT CHR$(54) produces the figure "6".

Reversed characters

There are no reverse-field equivalents in the CHR$ character set, as these are obtained using the RVS ON key (which is CHR$(1B), as it happens).

This is one of a (theoretical) maximum of 64 special control characters which when PRINTed don't normally generate a visible character but instead perform some screen control function. For instance, CHR$(17) is the same as the cursor down key. So **PRINT CHR$(17)** has the same effect as pressing CRSR down.

Controls

All the Vic control characters are listed in the CHR$ tables, and I've also included the C64 control characters too. Note that the Vic *doesn't* have CHR$(129); nor does it have CHR$(149) to CHR$(155).

The ASCII value of any key pressed (found using the ASC function following a GET command) will be the same character values shown, which is why the function keys are also listed.

Most of the control codes are self-explanatory, although the LOCK and UNLOCK commands may be unfamiliar. They simply lock the computer into its current display mode (graphics or text) such that a user cannot alter them with the CBM/SHIFT key combination.

When a key is pressed with the CTRL key, the appropriate control code is generated and the appropriate action taken. The exception is when an odd number of inverted commas has been typed. In this case, to help identify these codes (some help!) the computer generates a reverse-field character; for control codes in columns 0 and 1 these are the same characters as those in columns 4 and 5, but in reverse. And for the shifted control characters in columns 8 and 9, they appear as the reversed version of the corresponding characters in columns C and D.

Tricks with control characters

This means that control codes which can't be produced directly by pressing a key *can* be generated in two ways – by using their CHR$ values or by fooling the computer into thinking that the character embedded in a string is a control character.

If we are in graphics mode, and want to include a TEXT control character, the simplest way would be to PRINT CHR$(14). But the TEXT control could be incorporated in a character string, say A$. First type:

A$="   "

(Note the double quotes!). Then use the DEL key to delete the second of these two quotes. After the first quote the computer goes into programmed cursor mode, the second causes it to revert to direct mode.

Now select reverse field (press RVS ON) and type the appropriate letter, in this case "N". Cancel the reverse field mode (RVS OFF), type the closing quotes and press RETURN. The TEXT control character is now part of A$, and "PRINT A$" should flip the display into TEXT mode. Voilà!

This technique can be extended to include nearly all control characters. But be wary of trying to use CHR$(0) or CHR$(13): these will cause problems.

Listing control characters

When a program with control codes is LISTed, most will appear in their normal reverse field form. But those which have to be actioned regardless of the quotes mode (such as DEL) will actually be actioned during the LISTing.

So the technique of 'forcing' a control character such as DEL (using RVS-"T") means that characters on a Basic line can be deleted during listing. This could be useful for hiding passwords or quiz answers; and it's worth experimenting with – although don't place too much reliance on this method of security as it is very easily broken by someone with a bit of inside knowledge.

A note for Pets

In the CHR$ tables columns 6 and 7 are a repeat of C and D, and E and F are repeats of A and B. This is slightly different to the way that the Commodore Pet computers handle CHR$ values. But with the exception of columns 6 and 7, some of the control characters, and the pound sign CHR$(92), these lists also apply to Pets.



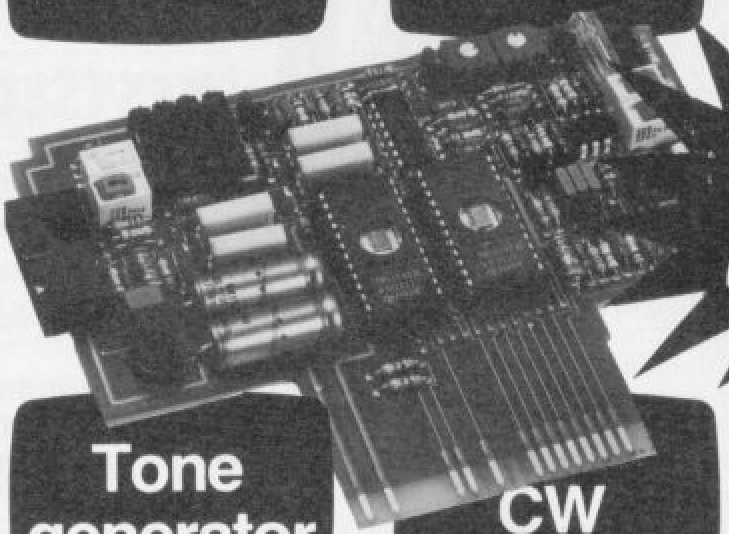
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- Sync idle, slow mode and word by word mode.
- Auto transmit/receive switch for telephone line.
- Replay received message with resend command.
- Four CW identification options.
- CW FSK identification for RTTY.
- RYRY generator (baudot RTTY test signal).
- Quick brown fox generator.
- Several callsign generators available.
- Received text word-wrapped at end of screen lines.
- Keyboard selectable normal/reverse tones for all modes except for CW transmit mode.
- Direct mode for fast break-in operations.
- 24 hour real time clock displayed on status line. (CIA TOD clock with automatic 50/60 cps selection).
- Send current time with QTR command.
- Random mode sends 5 character groups for morse practice.
- Loop mode for printer adjustments or beacon-like operation.
- Keyer mode allows connection of manual Morse paddle.
- Unique large TIMES SQUARE character display option.
- Ignore carriage return on receive option.
- User definable switch facility.
- Page mode allows reception of RTTY pictures etc.
- Byte mode allows transmitting program files.
- Modem mode with automatic Bell/CCITT selection.

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ComputerWorld's COM-IN 64 program is supplied with self supported power supply, cables and connectors. In the extensive 70 page user manual you'll find the complete schematic and 2 program listings for QHT locator and LOGBOOK.

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The Cheapest Vic Printer?

Softex Printerface put through its paces

by Chris Durham

From time to time some owners of a Vic or a 64 may have cast slightly envious eyes at those of their friends who own a ZX-81 or a Spectrum. Not because the computers are *better*: but because they can plug in a printer for under £50 and get hard copy printouts of their programs. How many of you wish that someone would come up with a similarly-priced printer for the Commodore computers? Well, now someone has; or, more to the point, someone has come up with a way of using the ZX-Printer with the Vic. We gave Chris Durham the Vic version to investigate: there's a 64 version too.

The cheapest Vic printer in the world! That's how Softex Computers of Bournemouth describes the combination of a ZX-Printer and its Vic-ZX Printerface. At £71.95 (including p&p) it gives everything you need to obtain hard copy from your Vic: that certainly seems like A Good Thing. But does it really work?



The ZX-Printer

Those of you who've seen the Sinclair ZX-Printer in operation will know that it works by sending a stylus across a metallised paper, burning off the silvery metal coating to reveal the black underneath.

For such a small printer the print quality is not too bad, though you have to be careful not to fold or scratch the paper too much. And the paper is only four inches wide, so printing on that is normally limited to 32 columns.

The characters are built up rather like the method a CRT uses to create a TV picture; the stylus scans across the paper building up the characters one line of dots at a time. To print a character seven dots high therefore takes seven scans across the paper. To prevent the stylus having to return to the start position each time there are actually *two* stylii on a continuous belt travelling in the same direction all the time.

This contrasts completely with the way the normal dot-matrix printers operate, units such as the Vic-1515. They print in columns of dots across the page, printing each character completely before going on to the next. So just how does the ZX-Printerface get round this problem?

The ZX-Printerface

The ZX-Printerface consists of a cassette, a cable with appropriate connectors and some instruction sheets. The cassette contains the really vital part since this is the program which does all the conversion and send the correct signals to the ZX-Printer. It is in machine code, with a small Basic program to put information on the screen when it is first run.

There are in fact two programs on the cassette, but I will come to the second one later.)

The cable plugs into the ZX-Printer connector at one end and the User Port on the Vic at the other. There is also a small twin cable with a plug which connects to the Sinclair power supply for the printer – the printer cannot work without this since the Vic cannot supply the power required.

The instructions are duplicated on A4 paper in rather small type and some of the program listings in particular were a little difficult to read; this cannot detract from the fact that all the information you need is there, including several example programs.

The first program on the tape is loaded and run immediately after switching on all the power supplies. A short 512-byte machine-code program is loaded into the top of the memory; and the Basic sets the 'base' address and tells you how much free memory is left – it doesn't matter whether you have expansion RAM connected, the program will always relocate itself correctly and tell you how much memory remains.

Once activated the program remains working even after typing NEW or loading and running other programs. The one thing you should avoid doing is pressing RUN/STOP and RESTORE, since this will disable the interface and it will no longer work. You can restart it without reloading, but it's a bit laborious.

The nice thing about Printerface is that you use all the normal Vic printing commands; you don't have to learn a new set of instructions. Program 1 shows that the normal OPEN, PRINT and CLOSE all work without change. This is printed in the normal 32 column mode and the printout from that program is shown in **Example 1.**

```
10 OPEN4,4
20 FOR A=1 TO 10
30 PRINT#4,"THIS SHOWS A FULL 32
 COLUMN LINE";
40 NEXT A
50 PRINT#4:PRINT#4:PRINT#4
60 CLOSE 4:END
READY.
```

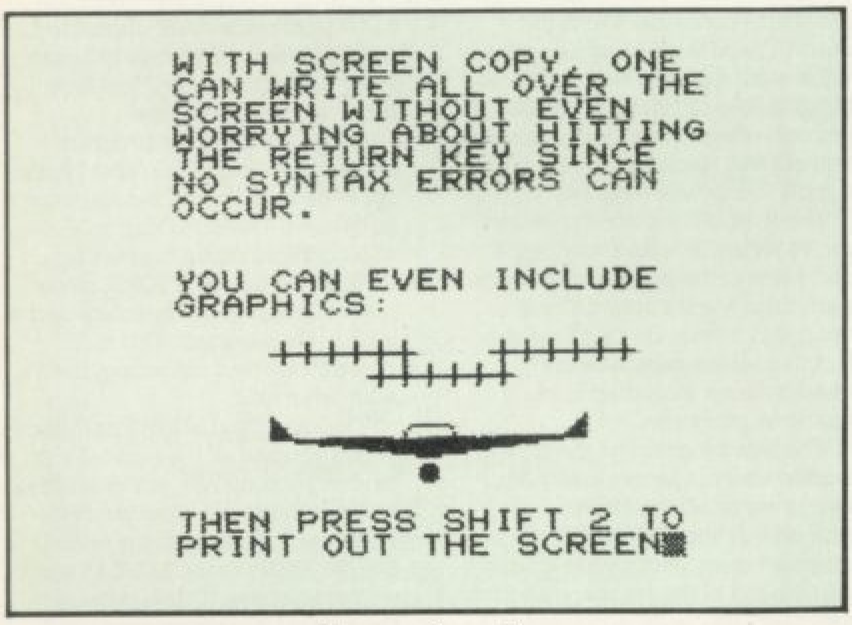
Program 1

```
THIS SHOWS A FULL 32 COLUMN LINE
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THIS SHOWS A FULL 32 COLUMN LINE
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THIS SHOWS A FULL 32 COLUMN LINE
```

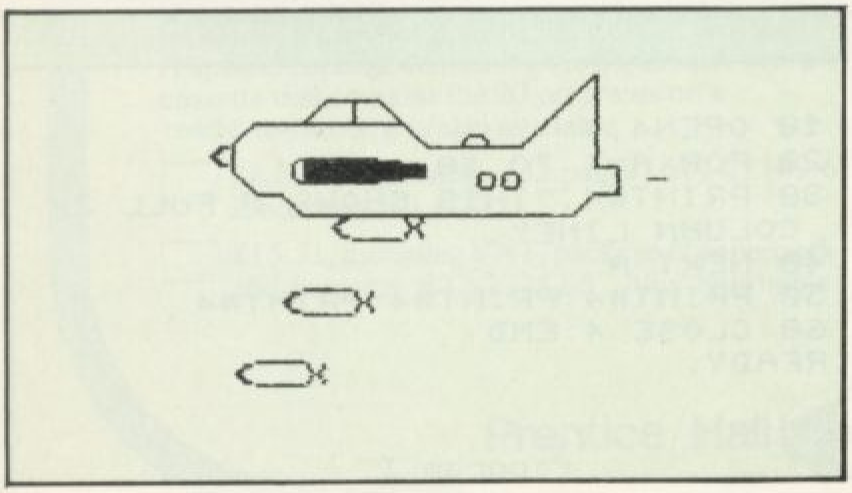
Example 1

```
This is to be a 43 column line when printed
This is to be a 43 column line when printed
This is to be a 43 column line when printed
This is to be a 43 column line when printed
This is to be a 43 column line when printed
This is to be a 43 column line when printed
This is to be a 43 column line when printed
This is to be a 43 column line when printed
This is to be a 43 column line when printed
This is to be a 43 column line when printed
```

Example 2



Example 3



Example 4

Most people might have been content to leave it at that, but not Softex; they went even further with the Printerface, and up to *43* columns can be printed. This is where the second program on the cassette comes in. By loading and running it after the first one, you have the option of having 37 or 43 columns of printing – with full upper and lower case

Extras

This program takes a slightly larger chunk of memory; a further 1536 bytes in fact. It even looks to see if you have enough memory left; and if you don't, it cuts down on the facilities! The program actually redefines the character set to be only six dots wide instead of eight as in the 32 column mode. In spite of this the characters are still quite readable, as a glance at **Example 2** will show.

It is when you come to read the sample programs that you realise that Softex really has come up with something useful. Many of you will be aware that the Sinclair computers have a screen-copy command, enabling the contents of the screen to be cast for all time into hard copy. Well, Softex has included a program in Basic to do just that on the Vic. You can either incorporate it in your own programs (evidence of your highest score at Pacman, for instance?); or you can use the routine as printed, to write all over the screen and then save it to paper. **Examples 3 and 4** show that you can mix graphics and text quite freely and still get a faithful copy.

There is also a high-res dump mode for printing pretty pictures, examples of plotting sine-waves, and even a routine to print out the contents of DATA statements in neat lines with no wraparound. You're also shown ways of changing the number of characters per line – and even the speed of the printer. A good and useful collection of extras.

A CBM version

Although it would not be too difficult to convert this lot from the Vic to run on the 64, the hard work has already been done for you in fact: a version of Printerface for the 64 is available from Softex at the same price as the Vic-20 version. Presumably the screen-copy program will work for over 40 columns, in which case you can draw even prettier pictures than with the Vic. Don't forget to specify which version you require when ordering!

Summary

Given the limitations of the Sinclair Printer, Softex has come up with an answer for producing cheap hard-copy from a Vic or a 64. The facilities which have been included in the package are all extremely useful, and the author has tried to get as much as possible out of the system. You can even do things with this combination that are not possible with the 'official' printer, the Vic-1515.

All in all I think Softex is to be congratulated. For those of you who really need hard copy listings of your programs, but just can't afford the £200 plus for a dot-matrix printer, this could be the answer. Any limitations of the system are due more to the ZX-Printer than to the Printerface, so if you get the chance of a good second-hand ZX-Printer (with power supply of course) then the £20.95 for the ZX-Printerface alone would probably be money well spent. And even buying a new printer still makes this combination good value. My verdict? Nice one, Softex!

Under review:	Softex ZX-Printerface
Description:	Runs a Sinclair ZX-Printer from Vic or 64
Supplier:	Softex Computers 37 Wheaton Rd Bournemouth Hants BH7 6LH
Price:	£20.95 inc. p&p (or £71.95 also including ZX-Printer and power supply)
Summary:	Very good – and good value too.

Mr. Chip
SOFTWARE

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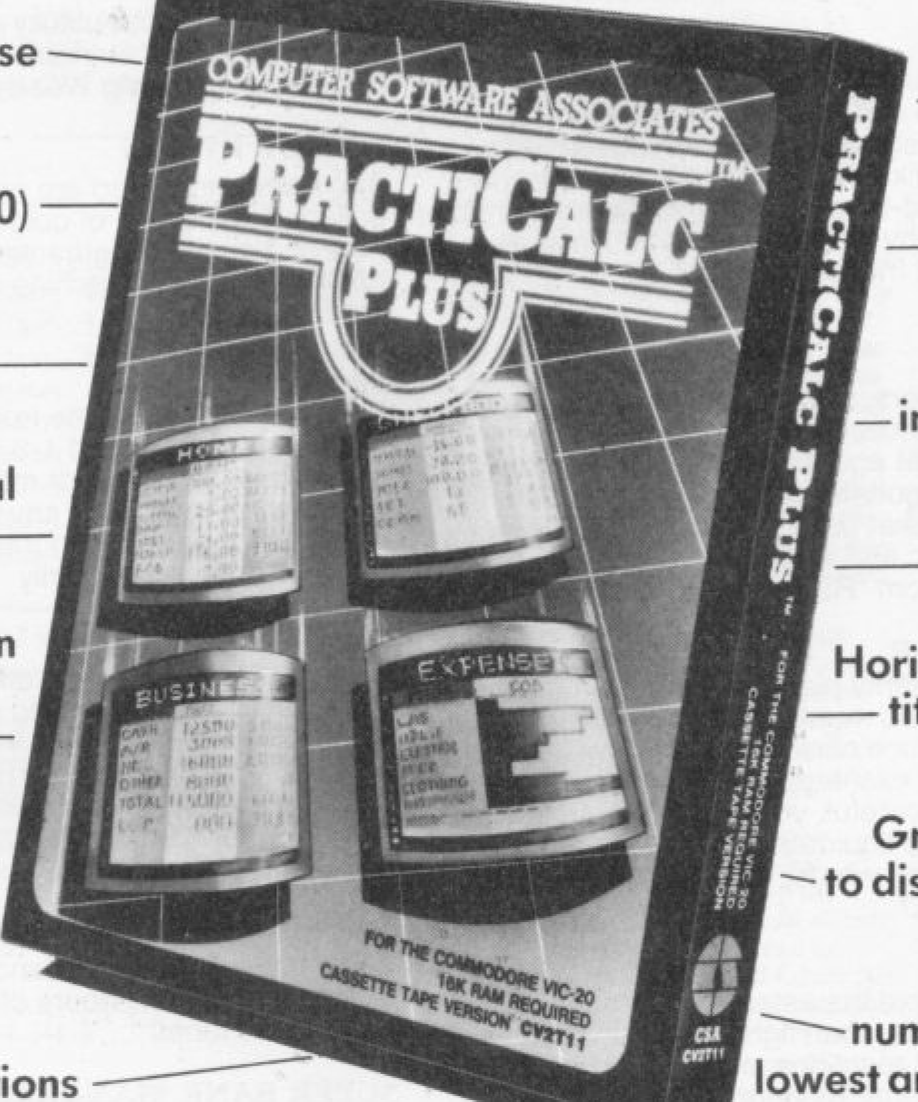
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CU 12/83

Two extended Basic packages for the 64

Simons' Basic vs BC-Basic

by Mike Todd

The Commodore 64 is noted for sophisticated graphics and good sound but has no inbuilt facilities for handling them. So when a schoolboy, David Simons, produced a new Basic enhancement package that substantially extends its range of commands, Commodore jumped at the chance to cover its oversight, and marketed his Simons' Basic worldwide as a cartridge.

David Simons had got his 64 remarkably early; so did Brian Candler, another schoolboy. He's done the same thing, calling his version B-C Basic. Simons' Basic is now well known; B-C Basic is cheaper. So how do they compare?

A glimpse through the list of commands available shows that Simons' Basic (SB from now on) has more commands than BC-BASIC (BCB). And since the most-used commands are likely to be in the area of graphics and sound, that is where we will start looking.

Graphics

There are two basic *graphics modes* on the 64. The normal high-resolution mode gives 320 horizontal points and 200 vertical; but there's a limit of only one colour in each 8 x 8 cell on the screen. And then there is multi-colour mode which reduces the horizontal definition to 160 but allows more colours.

SB changes the co-ordinate range to match the mode being used, BCB retains the same range regardless. There are arguments in favour of both methods; the former is more logical, but the latter does at least allow a hi-res program to be changed to multi-colour with ease.

The normal text display has a second mode in which each character can have a different background colour (this is known as the extended background mode). BCB uses **MODE n** to select the appropriate graphics mode; SB uses commands such as **HIRES**, **MULTI** and **BCKGNDS**, with **NRM** returning to text mode – the plotting colours are set as parameters to these commands.

Because BCB doesn't set colours as part of the mode selection, there are additional commands such as **SETCOL**, **GCOL**, **BORDER**, **PAPER** and **INK** for that. SB has colour selection commands for setting border and screen colours and to amend the graphics colours once they have been set.

Plotting points and lines are the minimum capability of any graphics system. Both packages provide for these, although they differ in their co-ordinate systems.

Most graphic plotting assumes that the origin (x=0,y=0) is at the bottom left of the screen, which it is in BCB but is SB it is at the top left, which means an additional Basic calculation to turn it up the right way.

Table 1: the extra commands you get

INPUT/OUTPUT COMMANDS	
JOY	JOY
JOYX	POT
JOYY	PENX
PADDLE	PENY
PORT	FETCH
KEY	INKEY
KEY$	KEY
	DISPLAY
	ONKEY...GOTO
	DISABLE
	RESUME

ARITHMETIC FUNCTIONS	
% (binary)	% (binary)
$ (hex)	$ (hex)
BIN$	MOD
@ (convert to hex)	DIV
(2 byte PEEK/ POKE)	FRAC EXOR
! (4 byte PEEK/ POKE)	

STRING MANIPULATION	
INSTR	INSERT
	INST
	DUP
	PLACE
	CENTRE

There are several ways that a point can be plotted. The simplest is to put it at the given coordinates in the currently defined colour; but it may be necessary to invert the point, clear it or set it in some other way. And of course there are the different multicolours to be selected. All of these are catered for in both packages.

STRUCTURED PROGRAMMING	
[see text]	PROC... ENDPROC
	CALL
	EXEC
	LOCAL
	GLOBAL
REPEAT... UNTIL	REPEAT... UNTIL
IF...THEN...ELSE	IF...THEN...ELSE
	RCOMP
	LOOP...
	EXIT
IF...ENDLOOP	
RESTORE	RESET
POP	

PROGRAMMING AIDS	
	TRACE
	FIND
	DUMP
	DISAPA
	SECURE
	AUTO
	RENUMBER
	CGOTO
	PAUSE
	OLD
	COLD
	MERGE
	PAGE
	OPTION
	DELAY
	DIR"$"
	DISK
	ON ERROR: GOTO
	OUT
	NOERROR
	ERRLN
	ERRN

Beyond the point

Points are not the only things that may be plotted – there are lines, circles, parts of circles, boxes and text. SB provides them all, together with **BLOCK** (which is a filled-in box) and **ANGL** (which draws an angled line, defined as the radius of a circle) SB also provides an 'area fill' command and a **DRAW** command for generating shapes set up as control strings.

BCB provides only for text and simple line drawing, but at least it remembers the last point plotted; and it has a **DRAW TO** command, something which SB lacks.

It is possible to have two *screen areas* available for graphics work on the 64. BCB provides an easy way of selecting either of the two; and because the screen is cleared only by the **CLG** command, it is possible to set up two screens of graphics data and flip between them.

Changing the character set

Both packages allow the character set to be transferred into RAM so that it can be altered: SB does this with one simple **MEM** command. BCB provides two commands – **CHARSET**, which tells the 64 that the character set (and screen if you want it to) has moved, and a **COPY** command which then copies some or all of the ROM character set into RAM.

Once this has been done, characters can be redefined. SB uses the **DESIGN2** command followed by the RAM start address of the character to be

defined. This is followed by eight consecutive program lines of character definition using decimal points as blanks and '*B*' for dots.

This is awkward and could make for a very long program if a complete character set needs to be set up. BCB adopts a rather different and more versatile approach, with a **DEFUSR** command that takes the character code (so there is no need to calculate RAM addresses) and the row number, followed by the binary image of the row. Because this image *is* a number it can be in decimal, binary or hex; and the data could be read from DATA statements or from disk or cassette.

Programming sprites

Sprites (or Moveable Object Blocks – MOBs – as Commodore prefers to call them) are one of the great graphic attractions of the 64 and both packages provide a good range of sprite commands.

In fact, sprites are quite complicated things to set up: there are several parameters required to handle them. There is theoretically space for 256 sprite definitions, but only eight 'active' sprites are allowed at a time. This means that once a sprite specification has been set up in one of the 256 definition blocks, each active sprite needs to be assigned one of these definitions. By doing this, the 64 allows a single sprite to have its definition change very rapidly simply by altering the pointer to the definition.

As well as the *definition block*, each sprite needs to be assigned a *colour*, a *priority* over the normal screen characters (that is, whether it should go in front of or behind any normal screen data), and a sprite *type* (high-resolution or multi-colour).

SB sets all these parameters in the **MOBSET** command, which also turns the sprite on – **MOBOFF** turns the sprite off. BCB has individual commands for these functions.

Moving and positioning

Although multicolour sprites can be set up as normal sprites, with pairs of dots being used to define the colours, it is extremely laborious to do. One advantage of SB is that multicolour sprites are extremely easy to set up; the letters B, C and D are used in the grid (which for a multicolour sprite is only 12 dots wide) to determine which colour should be used.

CATEGORY OF FUNCTIONS	BC BASIC				SIMONS' BASIC			
	Range	Ease	Use	Reliability	Range	Ease	Use	Reliability
Graphics set up	****	****	****	*****	****	***	***	****
Plotting commands	**	****	***	*****	*****	****	****	****
Misc screen commands	***	****	***	*****	****	****	***	****
Sprite set-up	*****	****	****	****	***	****	****	****
Sprite programming	****	****	****	*****	****	****	**	****
Keyboard input	*	****	**	*****	****	***	****	***
Misc input/output functions	****	*****	*****	*****	**	**	*	*****
Sound set-up	*****	*****	*****	*****	***	****	****	*****
Sound programming	*	***	****	*****	***	**	***	***
String commands	*	****	****	*****	****	***	****	*
Arithmetic commands	****	****	****	*****	**	**	***	**
Structured programming	***	****	*****	*****	****	****	*****	*****
Programmer aids	none	none	none	none	*****	****	**	***
Total points	37	49	47	59	47	43	42	47
Overall total	192				179			
Price	£19.95 inc P&P				£50			
Value for money	9.62				3.64			
Availability	**BC Computers 31A Grosvenor Avenue, Long Eaton, Notts NG10 3FQ**				**Commodore dealers**			

Table 2: *Summary of performance. The 'value for money' line is basically an 'asterisks per pound' indicator, so the higher the result the better.*

Both packages allow sprites to be positioned on the screen. But this can be a little tricky when sprites are being moved off the screen as a glance at the user manual will show. BCB has looked after all these problems and even accounts for the difference between machines on either side of the Atlantic, where the necessary calculations will be different.

Moving sprites in Basic is extremely slow, and so both allow sprites to be moved as part of a single command. SB only allows one to be moved at a time, and pauses in the program until this is complete. BCB allows *all* sprites on the screen to be moved; and because this is done under interrupt control the program can continue execution *while they are moving*.

Of course there's probably not a lot of use in moving sprites unless you can detect if they collide with anything; and both BCB and SB provide fairly easy methods of doing this. Unfortunately, the way that the 64 decides whether a collision has occured makes detecting them rather difficult: neither package has provided any way of getting over the problems.

Sound assistance

Both packages allow *waveforms* to be chosen, the *envelope shape* to be set and *ring modulation or sync modes* to be selected. SB does it rather clumsily, though, and the **WAVE** command is really only another way of POKEing the appropriate control register: so it requires a binary image of this to be set up.

If the pulse waveform is selected, the pulse width value must be set up with a POKE on SB. Unlike BCB, there is no command for this.

Each voice on the 64 must be individually turned on and off in order to generate the sound envelope. SB can only do this by setting and clearing a bit in the WAVE command, and this is extremely messy. But BCB by contrast has **ATTACK** and **RELEASE** commands available.

BCB also has individual commands for setting all of the sound parameters quickly and simply, and there's a **PITCH** command too. Rather surprisingly, SB does not provide these – instead it uses strings to generate sounds. These are set up with the **MUSIC** command and then played (on the voice) with a **PLAY** command.

Structured programming

Structured programming has become the trendy watchword for personal computer users, although professional programmers have been using it for quite some time. In essence it just means abandoning GOTO and GOSUB so that subroutines are known as 'procedures' and called by name rather than line number.

These should have the facility of having data passed to and from them, and the ability to use variables names at a local level (known as 'LOCAL' variables) so they do not affect similar named variables being used outside the procedure ('GLOBAL' variables).

SB has the ability to set up procedures and define LOCAL and GLOBAL variables. The (apparently preliminary) version of BCB that I have does not support these, although the next release will reportedly have them available.

Helping input

Reading joysticks and paddles is provided for with both packages, but SB only caters for one joystick and one paddle pair – BCB can read *both* pairs of paddles.

SB has commands for accessing the lightpen input, while BCB allows the user port to be

accessed very simply and efficiently.

Input comes from the keyboard as well, of course; and there SB has a range of commands for reading the function keys and assigning strings to them, and for limiting the number and type of characters that can be accepted during input.

The only specialised input feature in BCB is a simple **KEY** command which will retrieve the ASCII value or character of the key which is currently being pressed.

String manipulation

BCB provides only an **INSTR** function allowing a string to be searched for another and returning the position where it was found. SB has a variety of string commands that allow one string to be inserted into another, strings to be duplicated many times, and a PLACE string command similar to **INSTR**.

Programmers' Aids

A unique feature of SB is that it has a range of programmers aids available which are there to assist during the programming phase.

These include the usual 'toolkit' facilities – like **AUTO** to produce line numbers automatically, **RENUMBER** which renumbers the lines (but regretably doesn't renumber GOTO or GOSUB references in the program), **TRACE** which shows on the screen the line numbers as they are being executed, **FIND** for searching a program for specified characters, and **MERGE** which reads a program from disk or cassette and sticks it on to the end of the program currently in memory (which is really an APPEND command and is of limited use).

There are a couple of other commands for controlling listings on the screen within SB. For instance, the number of lines displayed can be limited, thereby effectively 'paging' the listing and making it easier to read (except that you cannot abort this and must list to the end of the program before making any changes).

Disk access is available too, using **DISK** to send commands to the disk and **DIR"$"** to read back the directory. There are no commands though to read the error channel, nor for direct loading or saving to disk.

Finally, SB has an **ON ERROR** facility. This will jump to a specified program line as soon as an error occurs; and once there, the line number and type of error can be identified. That can be extremely useful for trapping unexpected errors during program execution, although it does not allow the RUN/STOP key to be trapped.

Bugs and blunders

Looking first at Simons' Basic, I would probably need an article at least as big as this one to describe all the bugs and problems discovered to date. I will not attempt to list them all, but will mention a few general drawbacks that exist.

For one, in many of the commands which use strings there appears to be no consideration of the case when the strings contain no characters (that is, they are null strings). And in those circumstances all sorts of rather unpleasant things can occur.

Little attention has been paid to the case when the screen moves, and any commands which write directly to the screen (of which TRACE is an example) just will not work in this instance. In fact, TRACE continues to put its line numbers into the memory where it thinks the screen *should* be – and this could trample all over anything you may have there ... which could be your program, some machine code, or other data.

Range-checking on most of the SB commands is fairly poor, and the DUP command will allow you to make a string which is larger than the maximum 255 characters (it ends up as some odd length).

Simons' Basic keywords must not appear in any strings in DATA statements unless they have quotes around them, otherwise they will be turned into tokens. This actually applies to one of the example programs in the handbook: it gives a DATA line containing the word 'STARLING' and that includes the SB keyword 'LIN' – so it will not read back as expected.

There are many other bugs and problems. The result? A package which, although superficially exciting, is actually of very limited use.

In addition, many of the commands are rather badly presented and could have their syntax significantly improved to make them easier to use. Even the handbook is riddled with errors – example programs which will overwrite themselves with sprite data, some commands not described, and many errors of fact (including a list of colour codes which are actually for the Vic-20 and *not* the 64!).

Commodore admits that "early versions" of the Simons' Basic cartridge contain some known bugs. They are as follows:-

- BLOCK and REC do not work with LOW COL
- DUMP ignores minus signs
- ONKEY may jam the keyboard if another key is pressed while the GOTO part of the command is processed
- DISABLE does not work with ONKEY
- DATA STATEMENTS containing Simons' Basic keywords will print those words as graphics symbols. (This may be overcome by enclosing the words in quotation marks.)

An errart a sheet for the Manual has also proved necessary Copies are available from the Commodore Information centre.

"These bugs will be corrected in subsequent cartridges" says Commodore ...

BC BASIC	SIMONS' BASIC
GRAPHICS COMMANDS	
MODE	HIRES
CLG	MULTI
PMODE	NRM
	BCKGNDS
	CSET
BORDER	COLOUR
PAPER	LOWCOL
INK	HICOL
SETCOL	
GCOL	
PLOT	PLOT
POINT	TEST
DRAW	LINE
DRAW TO	REC
HPRINT	BLOCK
SCRWAIT	CIRCLE
	ARC
	ANGL
	PAINT
	DRAW
	TEXT
	CHAR
CHARSET	MEM
COPY	DESIGN
DEFUSR	
SPRITE COMMANDS	
SPRCLR	MOBSET
DEFSPR	DESIGN
SPRPOINT	CMOB
SPRINK	MOB OFF
SPRPAPER	RLOC
SPRMODE	MMOB
SPRGCOL	DETECT
SPREXP	CHECK
SPRON	
SPROS	
SPRX	
SPRY	
SPRSPR	
MISC SCREEN FUNCTIONS	
MSAV	SCRSV
PRINT AT	SCRLD
CODE	PRINT AT
	USE
	CSET
	FLASH
	BFLASH
	FILL
	FCHR
	FCOL
	INV
	MOVE
	LEFT
	RIGHT
	COPY
	HRDCPY
SOUND FUNCTIONS	
ADSR	ENVELOPE
WAVEFORM	WAVE
PITCH	MUSIC
PWM	PLAY
VOLUME	VOL
ATTACK	
RELEASE	
FILTER	
CUTOFF	
FMODE	
RESONANCE	
RINGMOD	
SYNC	
CH3	
ENV3	

On the other hand, BC Basic is a little more limited in its range of commands. The lack of any programmers' aids tools, for instance, is rather a shame. But BC Basic is very robust and I have been unable to find any bugs or problems with it.

Not only that, but the commands are well thought out; and while they are occasionally a little more complex than some in Simons' Basic, commands in BC Basic are much more versatile and useful in practice.

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Afflictions

A Doctor Writes

Each successive generation of mankind has suffered the 'disease of the day' – from the black plague to consumption, from Tyranosaurus gouges to Concorde Ear. Today it's the coldsore, combined with a new group of related diseases or 'micro-diseases', that is taking its toll of humanity.

Each of these horrendous maladies, without exception, can afflict the unsuspecting home computer user. But the 'dedicated buff' is acutely vulnerable.

An intrepid and specially co-ordinated Disease Team has been assembled by Commodore User at no little expense. The Team Members have experienced a wide variety of these maladies; and in the interests of science and its shares in Gotham Bank Inc, it has made available its vast experiences of causes and symptoms (for an undisclosed fee) to an eminent medical practitioner and part-time florist.

The information below is the culmination of massive research. Don't miss this opportunity for a healthier life and healthier computing!

Frogger Syndrome

Frogger Syndrome, or 'Squashed Body', was entirely unknown until recently. Now, Frogger Syndrome is escalating to epidemic proportions. Its symptoms are plain and easy for the trained physician to recognise: lack of care in crossing major roads, an inscouciance towards cars, buses, and heavy lorries, an attitude of contempt towards lollipop men and rivers.

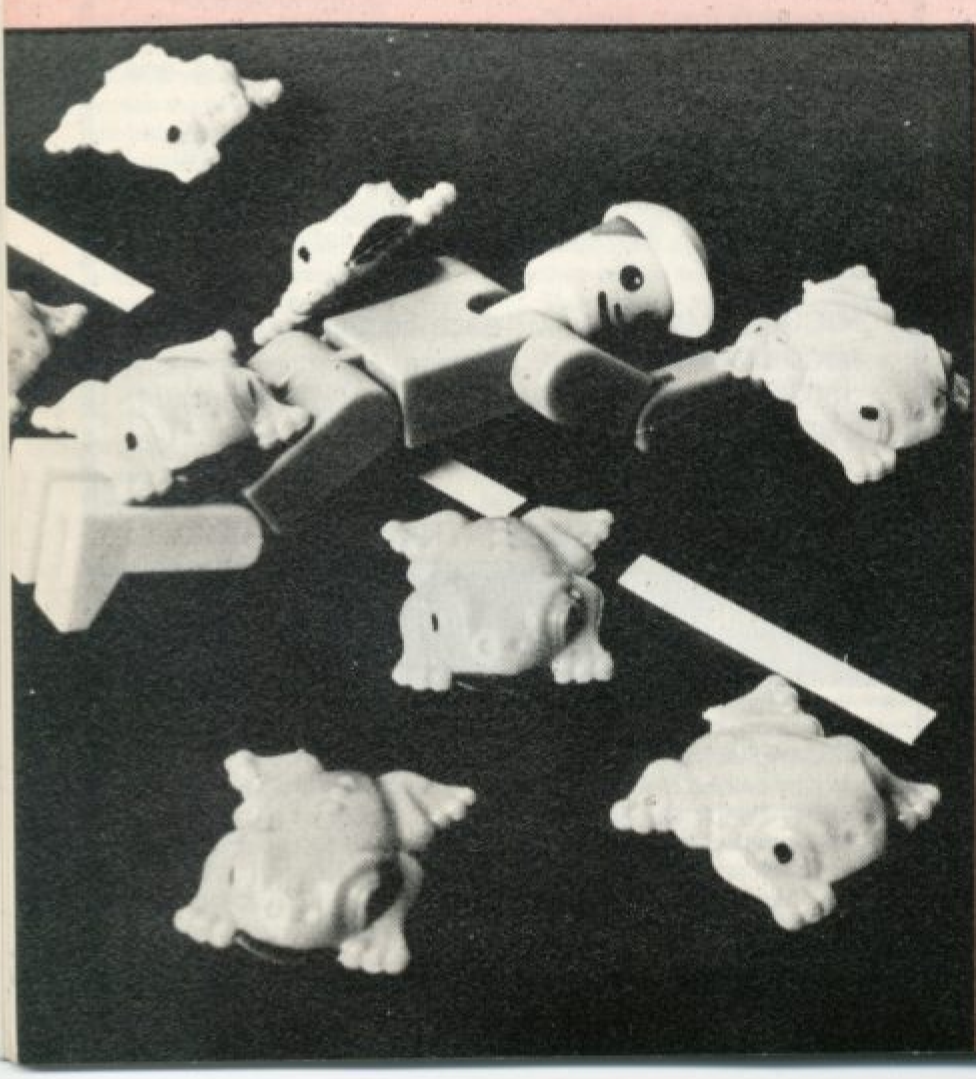
Early symptoms can be alleviated either by a timely dose of the Highway Code or by a course of Substitution Therapy. The latter usually involves replacing the malignant *Frogger* by the ameliorative *Purple Turtles**

On no account however should you attempt to administer the Green Cross Code, since this tends to encourage the related 'Android Attack' syndrome.

In more severe cases, subjects may find themselves making long-term use of NHS resources (BUPA participants excluded). They will also experience extensive stiffness of the limbs. This may be due to large quantities of plaster covering them. Terminal cases may involve premature use by someone else of life insurance policy.

Frogger Syndrome is without doubt a killer. But it seems to affect only humans – experiments with frogs have proved unproductive due to their lack of facility with a joystick (they tend to fall off).

* *Dr Parkinson adds that if the 'Purple Turtles' substitution option is attempted, care must be taken to ensure that the patient can swim.*



Aids

As a doctor I am often asked to explain this malady. To put it simply, Aids (or artificially Induced Debugger Syndrome) is an almost insurmountable urge to fiddle with one's pride and joy.

The so-called 'Programmer's Aid' is the most severe manifestation of this ubiquitous disease; in this variation it tends to affect 'buffs' exhibiting an unwholesome urge towards complex programming and the use of peripherals.

Aids is a 'transmitted' disease and this is where the problem lies. Doctors investigating the spread of Programming Aids are usually confronted by patients relating the following experience:

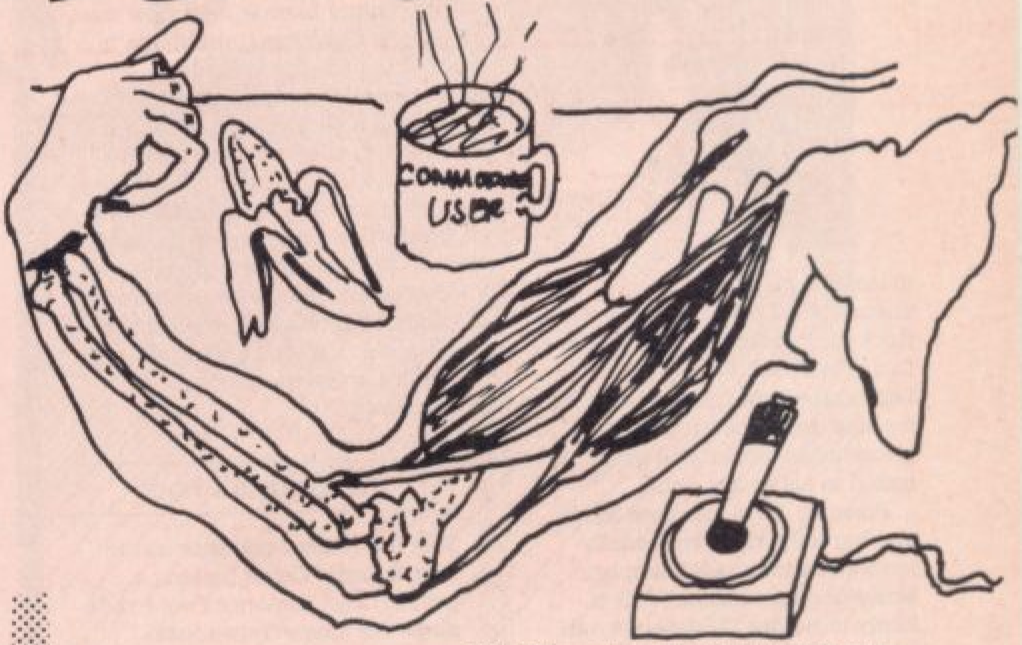
"I skipped round to my friend Dorian's to borrow his Commodore Programmer's Aid cartridge. I never guessed it could have been in any way contaminated.

" I know I should have checked for clean contacts before insertion, but it never occurred to me that Dorian neglected his personal hygiene. I haven't been



of our times

HEALTH WARNING





the same since – it's ruined my MERGEs."

Beware, Programming Aids can be extremely dangerous not only to you but to your friends. There is no known cure at present. Although massive research is being done on (to put it politely) 'cleaning up one's code', there are still too many bugs to contend with.

Tapeous Tanglitis

This critical disease invariably necessitates drastic surgery as it involves the removal of an offending data-carrying organ, usually known as 'the tape' (or sometimes 'the sodding tape').

The operation itself is harmless for normal healthy people. But for 'buffs', surgery can be particularly painful, especially for the subgroup of individuals who can be classified AM (Absent-Minded).*

The operation can be undertaken successfully in the home environment. But it does require manual dexterity and specialised equipment that may not be readily available, such as eyebrow tweezers and Grannie's scissors. The patient is conscious during the operation but, in severe cases, will require local anaesthesia or an effective substitute such as the Vic User Manual.

After removal, Tangled Tape can be substituted by 'new' or 'blank' tape. Due to shortages of tape-donors, certain ad hoc measures have recently been taken, such as dashing down to the car and snatching dad's *Frank Sinatra Live in Bulawayo* from the cassette player.

The patient will probably find any substitution unsatisfactory, however, and will occasionally show signs of 'blank screen' vision. This is normal but can result in bouts of depression and general loss of enthusiasm. Spirits may be revived by encouraging the patient to refil the screen; this is best accomplished with regular doses of Victuals.

* *Two simple tests for AM programming: (1) Does the subject habitually forget to make back-ups of his/her work? (2) Is it lunchtime yet?*

Hoarse Call

A related syndrome, this mild but deep-seated disorder is a peculiar variety of the common-or-garden 'sore throat' – but one that appears confined to mothers of 'buffs'.

It generally occurs the morning following the arrival of a new copy of **Commodore User** magazine; and at first glance the physician would be inclined to believe that the sufferer had spent several hours reading a foreign language out aloud in a continual monotone.

The problem is that patients deny they would ever consider doing anything so daft. Until further research suggests a cause, this mild but irritating disability will remain one of the medical mysteries of our time.

Joystick Hand

(Known popularly as 'Punter's Palm' – see note*.) Sufferers are characterised by their inability to shake hands, to pick up anything other than small mugs (without contents), and their apparent insatiable urge to press any buttons that happen to be at hand. Other symptoms include a wild-eyed eagerness to finger rigid upright objects (eg unripe bananas).

It is important not to be misled by this ailment – appearances to the contrary, the sufferer is not continually giving you the thumbs-up.

Treatment notes from the Come Friendly Bombs Rest Home for Incurable Buffs indicate a good response to several hours of the Carpenters played through non-removeable headphones in a darkened room.

Reports that Ronald Reagan has succumbed to this affliction are being strongly denied by the Whitehouse. Meanwhile, all arcade games have been removed from RAF Greenham Common.

* *Joystick Hand should not be mistaken for Clenched Fist which arises from a variety of other sources including 'syntax error' and 'file not found' disorders. Fortunately Clenched Fist from these causes is easily distinguished by bruising on the side of the hand, often with splinters embedded there that appear to come from a dining room table; and it is normally accompanied by patchy hair loss, the hair usually having been torn out by the sufferer late at night.*

Screen's Disease

Specialists in Screen's Disease have isolated certain viruses which are invariably present when the disease reaches fever pitch. These have now been found to include the strains of 'Dallas' and 'Coronation Street'.

During their presence, the Vic or Commodore 64 is disconnected (sometimes roughly) and the screen jumps from depiction of alien environments to the even more arbitary and intimidating environs of *South Fork* or *The Rover's Return*.

The malady generally affects younger members of the family but has been known to occur in adults. Sadly, it is disruptive to the family's well-being and may result

Medicine



in sudden outbursts of uncontrolled anger, particularly from the 'parent'. 'Junior' usually finds his or her Vic/64 hidden behind the sofa ('confiscated', in medical parlance) and may sometimes witness a ringing sound in his or her ears.

Pleas of, "Why can't we have another telly, dad" are usually ignored or may result in more acute ringing sounds. (This is likely to be the TV detector van men at the front door.)

Buffinitis

The most widespread disorder of the Computer Generation, Buffinitis is a longstanding malady the presence of which has surprisingly yet to be recognised by some of the leading medical authorities.

It is often concealed however behind other symptoms, notably the so-called 'hacker' effect. Buttertodd, whose unparalleled work in the general field has not received the acclaim it deserves, has accurately described the symptoms in a patient of just 16 years:

"He appeared one morning in my surgery, and I was immediately struck by his appearance – bags under the eyes, bags all over his faded corduroy trousers, large desert-style shoes, flecks of red and blue in the irises, a complete range of multicoloured biros in the top pocket, a shapeless and uncombed sweater of indeterminate age (all of which also applied to his hair). There was something odd about him – he was wearing a Commodore dust cover on his head.

"He first requested a fresh piece of sticking plaster to reconnect the nose-piece of his spectacles and then introduced himself as 'helloI'vewritteneight gamesand (deep breath)mymum saysI'vegottogetsomesleepsocan youtellmehowtoachieve (deep breath) smoothscrollingonanun expandedVicwithout (deep breath) usingmachinecode ...'

Dr Buttertodd relates how the interview proceeded with much sneering from the patients about their relative scores on *Attack of the Mutant Llamas*, and how the usual treatments (immersion in cold water, social events involving members of the opposite sex, visits to Charlton Athletic) seemed contra-indicated.

The sufferer, who incidentally gladly espoused the semi-joking self-description of 'buff' or 'computer enthusiast', apparently adjusted quite well to normality after his first visit to the Job Centre some months subsequently.

Peripheral's Foot

This interesting complement to Peripheral's Vision (seeing a printer) and Athlete's Foot (tradename for a new Taiwanese product that allows an individual to enter a three-legged race) is caused by a heavy device like a disk drive falling on the patient's foot.

There is no simple cure for this ailment. Many specialists prefer the prophylactic approach, urging the patient (the 'buff') to wear protective covering – such as Dr Martins. Alternatives include Pleading, a tricky psychological technique exemplified by this actual reported interview:

Doctor: *Why don't you remove the peripherals from the rickety trestle table your Uncle Dennis built last year out of orange boxes?*

Patient: *They're not orange boxes, they're dark brown.*

Peripheral's foot has many side-effects which can be painful to the insolvent.

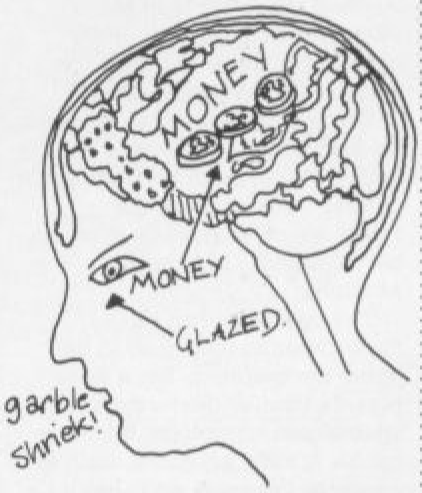
Tape ache

This syndrome covers a set of related symptoms ranging from the appearance of small roots to complete petrification, invariably accompanied by a glazed expression and a slack jaw.

In the early stages of the disorder the patient is continually rising from his/her seat in order to check that the tape counter is really going round; more advanced prepiles behaviour includes suspiciously peering into the cassette deck and applying an ear to it in a vain attempt to reassure oneself that the unit is indeed operational.

Subsequently a trance-like immobility akin to catatonia may be exhibited, leading in more that one case to the subject's nearly being cremated alive. The remedies do require the presence of a qualified physician or medical orderly, who can observe the gradual onset of 'intellectual wipe-out' and step in quickly to convince the subject that pouring a drink or going to see Charlton Athletic is indeed a good idea.

* *Interesting note: Buttertodd's research has produced a useful side-effect in reducing raging bulls to docile, befuddled pets by showing them how to load programs from a Commodore cassette unit. The last drawback to this potential breakthrough in agricultural psychology is now receiving the attention it needs: but as yet, it is still difficult to persuade the bull to hold down the shift key while pressing RUN/STOP.*



RAMnesia

RAMnesia in its common form can have an unpredictable and random effects. Occasionally it appears in the form of shrieking, often of incoherent phrases like "aargh it's died on me again" (in which event it will typically be once again accompanied by the hair-tearing syndrome).

Frequently it appears in expanded Vic owners who wander the house with sporadic and garbled muttering such as "Where the **** did I put the RAM pack".

But whatever the symptoms, RAMnesia can be distasterous for the 'buff'. He or she may be unable to use a computer for long periods of time. Close observation of the patient will reveal a severely wrinkled brow, a glazed and puzzled expression and a generally nervous disposition.

These are sure signs of RAMnesia. Fortunately, there are remedies: constant application of money is usually indicated, as with many disorders of the Commodore 'buff'.

The Blues

Once a term applied to popular music, this set of symptoms is now coming into medical parlance with reference to a puzzling condition where the patient continually insists that his or her field of vision is surrounded by a large blue rectangular border.

The only treatments immediately available have tended at best to be partial in their effects. In general the patient does stop complaining about the 'presence' of a substantial blue border, only to express a conviction that the border is now some other colour. So far a total of eight colours have been reported by subjects to the researchers.

Buttertodd did experiment with one radical treatment – excision of an offending Vic and substitution with a 64 – but this apparently resulted in patients reporting a blue effect over *all* their vision.

Conclusions

Make no mistake about it, home computing *can* be wholesome fun. But even the most resilient 'buff' can be 'brought down' by a lurking malady. The expert advice given above goes only a short way to offset the horrors awaiting the unsuspecting. Disease and affliction can strike at any time and in any place, whether you're at the keyboard, the joystick, the printer, or The Aroma Tandoori.

Take care, home computing can seriously damage your health – careless programming costs lives.

The researchers at the Come Friendly Bombs Rest Home for Incurable Buffs welcome any contributions to this important work. Readers of this magazine are exhorted to watch out for possible and actual afflictions, and to report them in writing to the editorial offices (address on page 1). If the submissions merit it, an update to the present report will be published early in 1984; and all successful submissions will receive a reward of one Vicwear sweat-shirt.



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Use the form below. Remember, you can use Basic abbreviations in your 88-characters-per-line maximum. And if you call it line '1', that saves one whole character ...

Code away!

Crossword

You've got a competition instead this time! However, it will be back next issue. You'll also have to wait till then to find out if you are one of the lucky winners.



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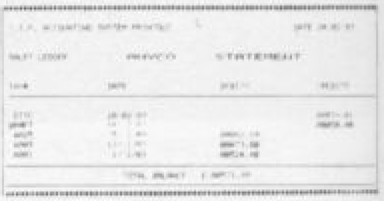
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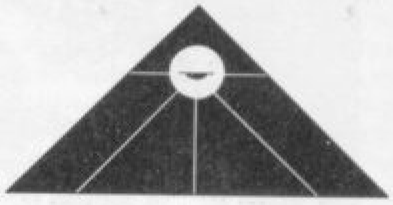
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Speed up your Basic

Two Basic Compilers reviewed

by Chris Durham



Most advertisements for games programs these days have eye-catching slogans like '100 per cent machine code' or 'fast m/c action' or 'm/c for superfast graphics'. The implication is that Basic is really too slow for such programs. And it's a sad fact that interpreted Basic just cannot compete when moving graphics or very complex programs are required.

Before you reach for your 'machine-code for beginners', however, there *is* a way of speeding up your programs without altering a single line of code. Chris Durham looks at two Basic compilers for the Commodore 64 to see if they live up to their claims.

The CBM 64, like most microcomputers, uses interpreted Basic as its primary programming language. An interpreted language is one which is decoded by the computer one line at a time in the order of the program logic. Addresses for GOTO and GOSUB jumps are not stored, but worked out each time the instruction is found; so a GOSUB within a loop will have to be worked out the same way every time the loop is performed.

Since the interpreter searches for specific line numbers one line at a time, this can cause a considerable overhead in a large program. Complex calculations can also slow down a program if worked out from scratch each time they are found.

What is a compiler?

A compiler, by contrast, converts the original language of the program into a more efficient form; and it will work out things like jump addresses in advance so that much less processing is needed when the program is run.

A true compiler will actually produce a machine-code version of the program, thus ensuring a substantial increase in speed. Unfortunately, true compilers tend to be rather large and expensive; so for microcomputers we tend to get 'pseudo-compilers'. They do make the program more efficient, but they stop short of actually converting it into machine code.

These compilers work by making one or more passes through the code of the original program, commonly called the 'source' code; and in doing that they restructure it by removing all unnecessary lines and REMarks and working out as many processes in advance as possible.

The compiled program, known as the 'object code', is then run in the same way as the original Basic program; but it now runs much faster.

The two compilers under review, Oxford Computer Systems' PETSPEED 64 and Dataview's DTL-BASIC 64, claim **speed increases** of up to 40 times and 25 times respectively.

As the review results show, these claims are somewhat exaggerated: speed increases of between two and ten times are much more realistic. Still, that's better than a poke in the eye with a Jerusalem artichoke.

Compilers are also claimed to **reduce the size** of the program. This varied according to the size of the original source code and which compiler you use; but in some cases the object code was over 30 times larger! Time for a truckload of salt with which to take the vendors' claims ...

PETSPEED 64

PETSPEED has been around for a long time, originally being marketed for the Pet by Oxford Computer Systems at £240. When PETSPEED 64 was first introduced it was priced at £125, but is now available from Commodore at a much more realistic (and much more affordable) £50.

This is a very easy product to use, reflected by the fact that the manual consists of a printed card with only three pages of instructions. In spite of that, it still covers all the major points needed to run the system, includes the additional options available, and even gives a memory map of how PETSPEED fits into the system. Also provided with the system disk (yes, you do need disk) is a security 'podule' which fits into one of the control ports.

The first thing that has to be done is to create the backup and working copies of the system disk. There are a total of 16 programs on the system disk and you need four extra disks on which to copy them.

Using a single 1541 disk-drive for all that copying is rather a laborious process; it takes the best part of an hour, and waiting for the disk to stop before swopping them over again gets very tedious indeed.

The copying is done using a program called 'Backup'. This has a nasty habit of flashing a very imperious message when telling you to insert the next disk. More than once I found myself opening the drive door before the disk had actually stopped (it runs on for two or three seconds after the message appears). If you do open the door too early you may corrupt the disk; you then have to start the copying procedure all over again, so be warned.

But don't be tempted to skip this copying, however laborious, because the CBM Disk Operating System is notoriously unreliable. And if you corrupt the system disk you will have to pay to get it replaced.

The compiler gives you the option of using either a single 1541, two 1541s or a CBM dual-drive system. The PETSPEED files themselves take up over 65K of disk space; the size of the programs that can be compiled on a single disk is therefore somewhat reduced. This is because several large working files are generated and stored on the same disk.

By using a second 1541 drive or a dual-disk system all the work files

RUN TIME (secs)	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8
Interpreted BASIC	1.5	9.8	18.0	20.0	21.6	32.0	50.6	116.6
PETSPEED 64	0.5	0.9	6.5	7.2	7.5	9.5	11.8	94.3
DTL-BASIC 64	1.2	2.9	8.8	10.1	10.3	16.0	23.7	105.2

Table 1

x increase in speed	BM1	BM2	BM3	BM4	BM5	BM6	BM7	BM8	10k prog	Sprites
PETSPEED 64	3.0	10.9	2.8	2.8	2.9	3.4	4.3	1.2	5.2	2.3
DTL-BASIC 64	1.2	3.4	2.0	2.0	2.1	2.0	2.1	1.1	1.6	1.7

Table 2



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GOLF (48K SPECTRUM)
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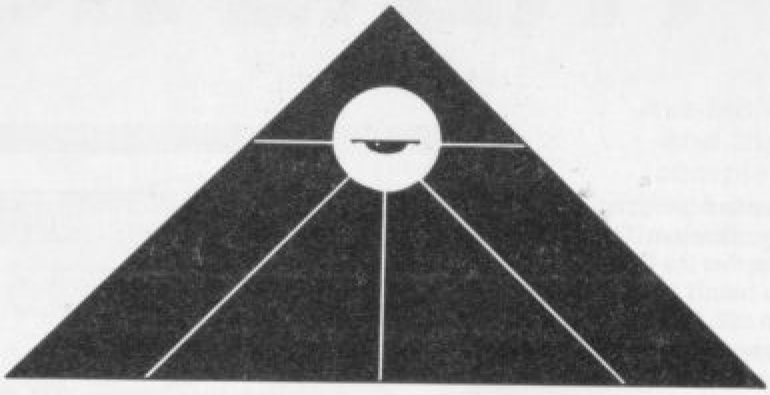
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are put on the same disk, giving an extra 65K of workspace.

DOS Problems

Unfortunately the CBM DOS does not appear to be reliable enough to run two separate drives virtually continuously for the time needed to compile a large program. Each time I tried, the system hung up after about 12 minutes. With smaller programs there is no problem provided they take less than 12 minutes to compile.

This can be a major drawback since you really only need two disk drives for the larger programs. The same problem occurs if you specify that you only want to use one disk, but have the second one connected. (The problem should not occur if you have a dual-drive interfaced through Oxford's INTERPOD.)

Note that you cannot use PETSPEED with an IEEE interface that connects to the expansion port. According to Oxford Computer Systems, PETSPEED can only access devices that are connected via the *serial* port.

Having loaded the source code on to the relevant disk and plugged the security podule into control port 2, you're ready to run the compiler. This is extremely simple; just load the initial PETSPEED program and run.

The compiler asks which disk configuration is being used and then requests the name of your source code. Once the information has been entered, the program beavers away happily with much grunting and groaning from the disk drive(s); a few minutes later the compiled program is sitting in memory waiting to be run. Provided you have debugged the source code beforehand (and avoided the very minor Basic exceptions that PETSPEED cannot cope with), your programs will compile without any other changes being made.

Under way

The compiler will of course pick up most Basic errors at compile time if it finds any, but this gets very time consuming if you keep having to re-compile each time; it is much better to debug your program using the interpreter and then compile the final version.

PETSPEED is a four-pass compiler – which means it has to go through the whole program four times. This is a fairly long process, taking about 15 minutes for a 10K program; even small programs take four or five minutes. The compiler indicates its progress on the screen, showing the line numbers for each pass in turn.

Once the compiler has finished, the workfiles are deleted from the disk. You are left with the object code in a file that will have the same name as the source code, but with '.WOW' appended to it. This can be LOADed, RUN and SAVEd just like a normal Basic program.

The security podule is only required during compilation, by the way; it is not needed when running compiled programs. So there's no restriction on selling or giving away the compiled version of your program. It has the added advantage that your program cannot be listed or altered, thus ensuring your own protection code stays hidden!

About the only Basic facility that PETSPEED cannot accept is dynamic arrays, like 100 DIM A(N) for example. Space is allocated for both arrays and variables at compile time rather than at run time; the compiler needs to know how much space to allocate. If it finds a dynamic array declaration it gets round the problem rather neatly by stopping the compilation during Pass 1 and asking for the array size. Once this is given the compilation will continue.

On the plus side there are a number of extra programming facilities which can be added to your Basic program before it is compiled. You may define mixed string and numeric functions in any combination – DEF FNA$ (X) or DEF FNA(X$), for instance. Integer 'FOR' loops are allowed too, and an option is available to make all characters in a variable name significant (Basic normally allows only two significant characters). Finally the STOP key may be enabled or disabled with a simple command.

On the other hand ...

It is when you come to use a machine-code routine called from Basic that problems occur. PETSPEED works by creating an intermediate code called 'speedcode'; it then runs this code using its own interpreter.

The result is that variables are stored completely differently from Basic, and the PETSPEED interpreter uses page zero locations for its own use. PETSPEED will not compile any program that contains machine code; and machine code routines that access Basic 2.0 variables will no longer work. Quite a lot of effort is needed to alter programs before they can be compiled under these circumstances; details are given in the manual however, for those who like a challenge!

PETSPEED cannot cope with extensions to Basic like Simons' Basic, either. In this case there is only one way around the problem: you will have to rewrite the routines in Basic 2.0.

As far as increasing the speed of programs, PETSPEED did fairly well: the standard benchmarks produced the results in Tables 1 and 2. You'll note that the speed gains varied from less than 2 for BM8 to over 10 for BM2.

Benchmarks may be a standard method of comparing speeds of execution, but they are usually very small programs; they're not typical of the sort of thing the average user wants to compile. I therefore did tests on two further programs – a 10K game which included music and a lot of GOSUBs, and a small sprite graphics program. These were standard Basic programs unaltered in any way. The results are also shown in Table 2 and give the average speed increase of each compiler over the interpreted version. Again, the results indicate that speed increases of 40 times are just not realistic.

As far as reducing program size is concerned, PETSPEED has the disadvantage that the run-time interpreter loaded with the program adds an 8K overhead; any program which starts off smaller than about 17K is going to end up *larger* rather than smaller. And the benchmark programs, most of which are only about 200 bytes in size, ended up at nearly 9K bytes after compilation.

Even the 10K program grew to over 17K, indicating that few ordinary user programs are going to find a size reduction.

Under review:	PETSPEED 64
Description:	converts Basic programs into compiled code
Supplier:	Oxford Computer Systems The Old Signal Box Hensington Road Woodstock Oxon OX7 1JR
Price:	£50
Summary:	it works – and the price is good

PETSPEED in summary

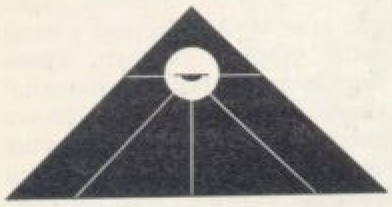
Although speed gains of between 2 and 10 may not seem large, they are in fact quite significant. The user will see a considerable difference in a program which runs only five times faster than normal. PETSPEED 64 is very easy to use, and it requires little or no amendments to the Basic program to get useful speed gains.

Unless you have a lot of Basic mixed with machine code, or you write your programs using an extended Basic, PETSPEED 64 will prove a useful tool. At £50 it is sensibly priced (especially compared to £125 when it was first introduced).

DTL–BASIC 64

Dataview also had a compiler for Pet systems prior to the introduction of a version for the CBM-64. The 64 version costs £114.42, and I must admit I expected something rather special for this. So bear that in mind as you read on.

The manual is a loose-leaf A4 binder containing 42 pages and it certainly seems to cover all the available options and facilities. At first glance DTL–BASIC appears to do all the things that PETSPEED couldn't; it handles dynamic arrays, m/c calls, extensions to Basic and reduces even small programs in size. Included with the manual are the system disk and the now almost obligatory 'dongle' security key.



Dataview also produces a tape version of the compiler, although this was not tested.

Backing up the system disk, which contains only four programs, took only 15 minutes to create a master and a working copy (do not be tempted to use the CBM COPY/ALL utility program if you have two drives. The programs appear to copy correctly, but will not run).

Compiling a program is very simple. When you load and run the initial compiler program you are presented with a number of options on the screen. You type the source code filename and the object code filename; and then you can select whether or not to have the source code listed on the printer and whether or not to have the errors and statistics printed out as well.

In addition, various commands are allocated to the function keys; these are also displayed on the screen. Pressing F3 will start the compilation.

The security key has to be inserted in the cassette port before compiling – otherwise the system resets to the power-on state. Unfortunately, if you leave the tape recorder plugged in by mistake the system *doesn't* reset; it just crashes.

Pass on by

DTL-BASIC is only a two-pass compiler and is consequently slightly faster than PETSPEED when compiling – about 20 per cent quicker, on average. When the compilation is complete the screen displays the sizes of the source program, the object program and the object file (the object file includes the object code plus the list of variables) – these statistics revealed that even with small programs (under 1K bytes) the size of the object code was between 65 and 80 per cent of the original source code.

You can now run the program which has just been compiled or you can go on to compile another. There's a facility to create a 'control file' containing the names of all the programs you wish to compile; the compiler will then go through the file compiling each program in turn without any further user intervention.

I was really getting quite impressed by this stage. But then I ran the compiled programs. Even a cursory glance at Tables 1 and 2 will show that the DTL-BASIC compiler was barely able to exceed a speed gain of 2. In only one test (BM2) was a speed improvement appreciably greater than 2 achieved – and that was against a gain of over 10 by PETSPEED.

It fared no better with the game or the sprite program – despite the fact that the manual takes pains to point out that "special attention" has been paid to making sprite control as fast as possible.

When running the 10K program it was the stopwatch rather than the actual effects which told me that the program was running faster (normally the reverse is true; you think the program is running faster than it actually is).

Plus points

To be fair, DTL-BASIC has a number of options which can be embedded within a user program; these will hopefully enable the compiler to do a slightly better job and make the object program run a little faster. Most of these demand a detailed knowledge of the source program, however, and they generally require amendments to be made to the source code.

For instance you can nominate which variables should be changed from floating to integer; and you can specify a 'special poke' mode which uses a base address plus an integer value when POKEing or PEEKing to an address greater than 32767.

Some of the speed thus gained could however be obtained just by rewriting the Basic program itself and incorporating integer arithmetic wherever possible. If this was done and the interpreted and compiled versions run again, I suspect that the speed gain would not be much greater.

There is also an option to disable and enable the STOP key as in PETSPEED, plus the ability to link files and allow variables to be overlaid between programs; these latter facilities could be quite useful.

I was unable to test the ability of the compiler to include programs that included machine code or extensions to Basic, but the instructions concerning these are quite clear and in most cases little change would be needed to compile such programs. There is a warning message generated each time an extension 'keyword' is discovered, just in case the word was a normal keyword misspelt! As such, this greatly extends the range of programs that could be compiled.

DTL in summary

I think that calling DTL-BASIC 64 a compiler is stretching the imagination a little. 'Optimiser' would be a better term for it, but I suppose the suppliers think 'compiler' sounds better.

It certainly does not justify either the speed increase claims or the price tag. Speed increases of up to 1.6 can often be obtained by rewriting a Basic program more efficiently – tricks like putting common routines near the start of the program, declaring variables in order of most use, and using integer variables wherever possible. A program would have to be written very badly indeed to get the speed increases of the sort claimed by DTL-BASIC. Even the ability to compile a program containing machine code and extensions to Basic is often of little consequence unless the speed advantage is worth having.

By spending some time going through both the manual and your program it should be possible to achieve increases in speed greater than those shown in these tests, but this detracts from the advantage of having a compiler which is otherwise extremely easy to use.

Under review:	DTL–BASIC 64
Description:	converts Basic programs into compiled code
Supplier:	Dataview Radix House East Street Colchester Essex CO1 2XB
Price:	£114.42
Summary:	Doesn't match up to claims or price

Overall conclusions

The claims that compilers are capable of increasing speeds by anything up to 25 or 40 times must be taken with a large bag of salt. While I could write a program that *would* demonstrate such an increase, it would be so inefficient and run so slowly in interpreted Basic that it would have little practical value.

When compiling a reasonably well-written program in Basic you can however expect a significant and worthwhile increase of anything up to 10 times without having to rewrite the program.

The advantage of compiling programs is that the source code is easier to follow since REMarks can be left in, subroutines can be placed in a logical sequence rather than in run-time priority, and the program can be generally 'structured' without incurring speed penalties.

Under these conditions PETSPEED 64 scores heavily over DTL-BASIC 64 in most areas. It is faster over every single test, over three times as fast in some. And making some of the changes to the source code recommended by the DTL-BASIC manual would also result in faster code on PETSPEED; these tend to cancel each other out therefore in any comparisons.

Only where machine-code routines, linked files with overlays or extensions to Basic are used does DTL-BASIC score over PET-SPEED. Against that must be weighed the possible speed increases and a price more than double that of its rival. Unless you cannot do without the extra facilities I can see little reason for paying more to get less.

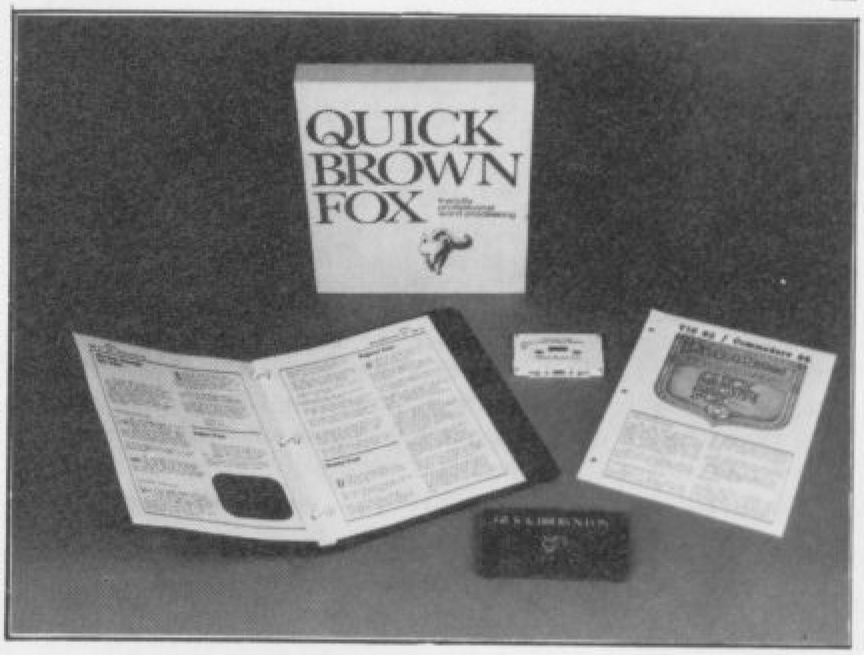
Word processing Round-up

Quick Brown Fox

by Chris Durham

For the third in this series of reviews of word processing packages, Chris Durham looks at SPT's Quick Brown Fox.

Quick Brown Fox is a cartridge program: and, as you would expect, it gives you more memory to play with as a result. There are 37,886 characters free when you start, equivalent to almost eight pages full of A4 text. But while you can merge files in memory, there does not appear to be any way of linking them to be printed as one document; this means that any document longer than eight pages must be printed in two (or more) parts. In practice I doubt this will be a great problem, however.



Functions available

The first thing that strikes you when running this program is that it certainly wasn't written specially for the 64. Those of you that remember using a Teletype will feel quickly at home with this system. (And for the rest of you, a Teletype was/is an old, slow clunky computer terminal like a teletypewriter – hence the name – with a keyboard and a printer.

When you switch on the 64 you merely get the line 'Quick Brown Fox'. Pressing the space bar then brings up the menu; and very utilitarian it is too).

All the facilities are there, though. Selecting *CLERK* brings up a sub-menu available for disk commands such as load, save and directory access. Pressing **T** puts you in *typing* mode and here you can bash out your words as with most other programs.

The big snag comes when you make a mistake. You can use the left and right cursor keys to go back and overwrite something, but neither the DELETE key nor the INSERT key have any effect (actually that's not strictly true – the DELETE key acts as a second cursor-left key!).

To do any editing you have to return to the main menu, using the left arrow key (QBF calls it ESC) and select **L** *(line edit)*. You are then asked where you wish to start editing from. Having typed a hopefully unique string of characters, a line appears with the word or phrase bracketed and the question 'Y/N or ESC?'; typing **N** causes the program to search for the next occurrence of the string. If you type **Y** you get to edit your line.

You might be forgiven for thinking that you can *now* use the INSERT and DELETE keys, but you would be wrong. Suppose you wish to insert two letters in a word. First you move the cursor to the character just after the position for the insert, then type **I**. You are now given a fresh line on which to type your two characters. After typing them you press ESC again and find yourself with yet another new line – still in line edit mode, but this time with the new characters inserted into the word.

Deleting characters is little better; you position the cursor in the same way and type **D**. At least this takes place on the same line. You can also type **dw** to delete a whole word, **ds** to delete a whole sentence, and **dp** for a whole paragraph.

If you merely wish to overtype you must type **r** which then allows overtyping only.

You want to move *up* the document rather than down? QBF does this by printing the text lines in reverse order; now that really is confusing!

A glance at the menu options will show that this is quite a sophisticated package in all other respects. For instance it has global edit, text move, a preview option to check out your document on the screen prior to printing, the ability to send and receive documents from other computers, and 'boilerplates' (which is a fancy American way of saying that text can be inserted in a standard letter from a disk file).

The *Global Edit* function is very good, allowing selective editing of the required string by asking the usual, Y/N or ESC?, each time it finds an occurrence of the string.

Move is a little more difficult; you have to go through the process of specifying the start of the string, then the end of the string, then the end of the string you wish it placed after – each time getting the first occurrence of the string and answering the inevitable question. It works, but can be rather confusing unless you are very careful when you specify the string of characters it is to look for.

One thing that is a little dangerous is that you can happily *Zap* the memory without any warning that you haven't saved the text to disk.

On the other hand you do get a warning if you try to overwrite a file on disk. this may well be what you intend, but if you chose the name of a file that already exists by mistake then you have the chance to stop and rename your file. Typing **D** from the sub-menu will read the disk directory and display it on the screen a page at a time. Since all the file accesses ask for the device number it is possible to swap between tape and disks, and even different disk drives; this could be quite useful.

Output

Quick Brown Fox supports a number of different printers, including Centronics-parallel printers from the User Port. Unfortunately it doesn't automatically support the modern printer attributes like underlining and emphasising type – a result of trying to be too generalised? The program can only deliver these extra functions if the printer has a backspace facility. The result is that everything is done by backspacing; a time-consuming, noisy and inherently wasteful process that doesn't do a particularly neat job on most printers anyway. There is a way of sending ESC codes to a printer to allow you to use its facilities more fully, but they don't always work and can send the screen funny as well.

Most of the printer options in QBF come up as questions after you select **P** on the main menu. You just have to answer the questions it asks about your printer; there are no presets apart from a normal Commodore printer. The program does allow proportional spacing, unusual in a program at this price – but of course this is only useful if your printer is compatible with it.

The formatting takes the form of embedded commands in the text. These are fairly easy to use and take the form #X where 'X' is the command 'string'. Examples are **#C** to centre text, **#P** to start a new paragraph and **#U** to start underlining. In most cases an identical symbol must appear at the end of the string in question to turn off the function again.

There are a wide range of these commands as you can see from the list. They do enable a very sophisticated document to be constructed, although it takes a little bit of practice to get them right; your first few attempts will look rather weird!

As I mentioned earlier, there is a preview facility, but this suffers from a couple of drawbacks. The text is formatted to the print width before appearing on the screen, but you get wrapround rather than scrolling. The result is that the text is, if anything, even more difficult to read than in the unformatted state.

The preview does help to spot a few of the more obvious errors, however; and since you are asked whether you wish to do an edit every few lines it does have its uses. On the other hand this breaking up does make it rather difficult though to view the document as a whole.

Other facilities

One of the big plus points for QBF is that SPT Electronics produces an expansion unit for the 64 giving an 80-column screen and the QBF word processor all in one unit; you switch in the facilities you require before powering up.

This does indeed open up possibilities, since the advantage of 80 columns 'on screen' cannot be over-stressed. The disadvantage is that you need a monitor to view it; there is no UHF output even if your TV would support 80-column working.

Some of the criticisms of QBF would disappear using this approach, which together with proportional spacing could produce very professional documents indeed. It would not overcome the awful editing, however, so you would have to offset this against the benefits of 80-column working: and the price of the combined unit failed to work with any of the monitors I tried, anyhow: so perhaps a separate short review may be in order once we get a working unit . . .

QUICK BROWN FOX COMMANDS

Main menu

Type	Add to text
View	Display text (preview facility)
Print	Print text
B.View	Show Boilerplate
G.Edit	Global edit (search & replace)
L.Edit	Line edit
Move	Move/Copy text
Delete	Delete text
Zap	Clear workspace (delete whole document)
Send	Send text via modem
Receive	Receive text via modem
Clerk	select file operations

Clerk sub-menu

Directory	List file names
Save	Save document to disk or tape
Retrieve	Load file from disk or tape
Merge	Load file and add to existing text
Erase	Delete a file

General typing

ESC	left arrow key – return to main menu
RETURN	force line feed
f3	insert tab character
f1	start of boilerplate
f2	end of boilerplate
CRSR R	cursor right
CRSR L	cursor left
DEL	delete

Line Edit commands

SPACE	space
CRSR R	cursor right
CRSR L	cursor left
r	replace text (overwrite mode)
RETURN	display next line (scroll down the document)
↑	up-arrow – display previous line (scroll up the document)
d	delete character
dw	delete word
ds	delete sentence
dp	delete paragraph
i	insert text
t	add new text
l	line edit from another place

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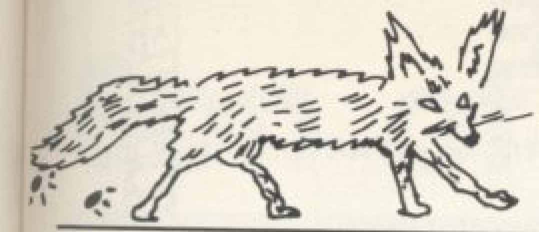


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The manual

The manual is a masterpiece of work for the complete beginner. It assumes no prior knowledge and leads you through the various exercises, gradually building up to a full dummy run using all the major features. Because it is laid out in increasing order of difficulty you can stop at any stage once you have achieved the required standard.

All this is great, but I rather wish they could have done it without the Americanised treacle approach – that jolly but slightly nauseating style of writing that gets American publications a bad name. To give you an example, you get this at the start of one of the sections: "You'll be there soon! Doesn't it make you breathless?" No, it doesn't. I do wish that companies would Anglicize their US documentation a little more, particularly because the QBF manual is in all other respects quite good.

There is no index as such although the Contents page at the front is nearly as good. There is a very useful crib sheet at the back giving all the menu options, embedded commands and edit commands; being a loose leaf binder means you can remove it and keep it to hand while you are working. For those of you who like your manual broken up a little there are some very amusing and well drawn cartoons throughout the book as well as lots of screen photos. There is also a disk with example letters and exercises, all of which are shown in the manual as well.

In summary – nice manual, shame about the treacle.

Limitations

By working through the manual even a beginner could learn how to use the system in a reasonable length of time. And as a general WP package Quick Brown Fox has some good facilities. Apart from a lack of footers and page numbering, all the facilities are there to produce some professional results.

Unfortunately they are so far removed from the way in which the 64 normally works that they really don't lend themselves to this machine. There are no facilities to alter the screen or text colours: no use has been made of any of the available function or control keys (with the one exception that F3 operates the TAB function): and the use of ordinary text keys as editing keys depending on the mode can confusing – pressing **d** sometimes types the letter 'd' and sometimes erases the letter under the cursor.

Conclusions

All in all, when compared to the potential of the 64 as a word processor, going back to the Teletype method of line editing as QBF does is frustrating to say the least. This system may be all right for those micros which don't have full screen editing facilities, but it grates so horribly when used on the 64 that one wonders why they bothered!

It seems a shame that the effort to standardise the program over a wide range of machines has meant that the program fails to take advantage of most the of the good points of the 64.

At £69, Quick Brown Fox is in direct competition with several word processors written specifically for the 64. As a result, it fares badly in a direct comparison.

This is not to say that it does not have its good points; the 80-column option may well appeal to those whose typing ensures they have little correction to do!

Unless there are good reasons for using it, such as compatibility with other machines, this one really doesn't do the 64 justice.

Next month I shall be looking at Wordcraft 40 and Vizawrite. The competition starts hotting up!

In-text commands

(all preceded by the hash [shift 3]symbol)

Bnn	add boilerplate nn
C	centre text until next occurrence
Dnn	dotted tab to column nn
F	form feed (new page)
H	turn on heavy print until next occurrence
Inn	nn lines per inch
J	right justification on/off
K+	allows keyboard entry at this point in a form letter
Lnnn	set left margin to nnn
Nnnn	send ASCII character nnn
O	overstriking on/off
P	start new paragraph
Rnnn	set right margin to nnn
Snn	set line spacing to nn
Tnnn	set tab to column nnn
U	set underlining on/off
Wnn	set character per inch to nn
X	set proportional spacing on/off

Quick Brown Fox on balance

For

- Comprehensive range of editing facilities including Global edit and block commands
- 80-column facility available (at a price)
- Range of disk control commands
- Exellent manual for beginners (if you ignore the treacle)
- Mail-merge and document assembly (boilerplates)
- Supports proportional spacing
- Compatible with Vic-20 version

Against

- Text does not appear on the screen as it will be printed
- Very laborious method of line editing
- Little use made of function or control keys
- No use made of colour facilities
- No automatic page numbering

Under review:	**Quick Brown Fox**
Supplier	SPT Electronics Tollesbury Essex CM9 8SE
Summary	Good WP facilities, badly flawed by inefficient use of 64's features.
Price	£69

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–Which Micro?, Aug 83

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– What Micro?, Dec 83



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– PC, Dec 83

"To sum up, Adventure Quest is a wonderful program, fast, exciting and challenging. If you like adventures then this one is for you"
– NILUG # 1.3

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– Computer Choice, Dec 83

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Son of 'Vic Revealed'?

'Vic Graphics' Reviewed

by Kevin Smart

Vic Graphics is Nick Hampshire's second book for the Vic, the somewhat controversial *Vic Revealed* (see our June issue) preceding it. Did he adopt the same style, in other words producing a technical book for above-average users? Does it have as many mistakes?



Vic Graphics is a 192-page paperback at the not unreasonable price of £6.95. Bookshop browsers should have little trouble spotting it, for it sports a flashy eye-catching cover. Impulse buyers beware, though, because placed right at the back on the outside cover is a blue sticker which declares "the Commodore Super Expander cartridge is required to run the programmes (sic) in this book".

OK, you do have the cartridge. So what about the book? The back cover states enthusiastically "This book provides the reader with an *introduction* to programming techniques used to generate graphic displays" and "*Vic Graphics* is a must for *every* Vic user". The emphasised words suggest it is suitable for novices – which is *not* the *Vic Revealed* style.

Inside

Let's take a look inside. The first thing your eyes meet after the contents page is, reasonably enough, the 'overview'. Here the author whets our appetite for more with such things as simulations, computer games (nearly everyone jumps for joy!), computer art and computer-aided design. As it happens, these are hardly mentioned in the book – or not even covered at all.

What *do* you get in terms of the actual contents? The book is divided into seven sections each consisting of several programs (invariably spelt 'programmes') on a specific topic. Accompanying text describes the program, how to run it, and the program structure: and sometimes there's a picture of what you get.

The programs, you will be pleased to hear, do actually work (makes a change!) and have been wisely dumped straight on to a Vic (or is it a Pet?) printer. The opening section is titled 'colour plotting' and starts with a description of how to control colour in high resolution and multicolour modes (incidentally this is an edited version of pages 137 to 142 of *Vic Revealed*: fortunately most of the errors have been corrected).

The first program we encounter is 'random colours'. It is not worth typing in: all it does is place large colour blocks on the screen (Vic manual standard!). The program in my opinion does not "generate interesting effects" as promised.

But the second program is slightly better. It POKEs a crude map of North America on to the Vic's normal screen. Unfortunately the good impression is spoiled by the accompanying narrative: for example, the description of lines 100 to 140 say that the screen colour is cyan when in fact it is blue.

Ah well. There is also a very curious comment that reads "make sure that the paper colour is identical to that of the background colour already plotted". Very odd, because this sounds so much like it is referring to the Spectrum . . . and it's not just a coincidence, as you'll soon find out.

'Rainbow' is really the first program to use any main Super Expander commands. It illustrates the limitations of the high-resolution colour display by drawing a rainbow out of semicircles.

Improving

It gets better, too. 'Fan' is quite a nice program (yes, I *can* dispense praise as well).

There is another mistake in the text, however – we are told this is the last program in the colour section, when in fact another one follows it!

That is called 'Colours', and it was probably not worth the bother anyway. It simply draws a circle and paints it in with an entered colour: nothing spectacular at all – especially since it could be done on a single line and *not* the 65 lines that this program takes. You want proof?

10 SCNCLR: INPUTC: REGION C: GRAPHIC 2: CIRCLE 2, 512, 475, 245, 350: PAINT 2, 512, 475.

This program marks the end of the colour section. You'll notice there's no use at all of multicolour mode (one of the Vic's best features). This is an incredible oversight on the author's part.

On to high-resolution graphics. The first 14 of its 58 pages describe the theory behind hi-res and have been taken from *Vic Revealed*: nothing wrong with that – after all, Nick Hampshire wrote *Vic Revealed* – but this time the errors are *not* corrected! We come face to face with such a monstrosity as:

IF A="*" THEN 30

. . . and half the theory is incorrect anyway.

There is however a nice entry for those people who did not observe the blue sticker at the back of the book: a Basic line-plotting program that allows you to alter the spacing between dots – unlike the Super Expander DRAW command (although the drawn line's coordinates do not strictly agree with those entered).

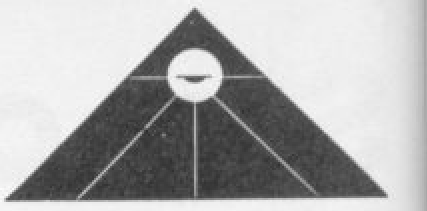
On the other hand

Wait until you read the text, though. For example, take this sinister line: "Foremost of these drawbacks [referring to the DRAW command] is that it uses *relative* coordinates". Now, relative coordinates." Now, relative coordinates are certainly *not* what the Vic uses: it uses *absolute* coordinates with a fixed origin. Relative coordinates are the distances away in X and Y directions from a variable origin. Which computer uses relative coordinates? Why, it's the Spectrum. Funny, the Spectrum seems to be appearing quite a lot.

'Arc 1' was the program which revealed all. As I've said, the Spectrum has been indirectly featured in the book; but I couldn't conclude anything until I found real proof. This came on page 71. How about this piece of text referring to the DRAW command? "Whether we use it in conjunction with the *third parameter*, namely *the angle through which it must turn* . . ."

This is absolute rubbish! The Vic's DRAW command cannot directly draw arcs: *neither* does it always "start off from the last point plotted". What does? Why, the Spectrum of course. The Spectrum command has three parameters – DRAW X offset, Y offset, Angle.

After this, I was not surprised subsequently to come across a book titled *'Spectrum Graphics'* by one Nick Hampshire which includes the *same* pictures and the *same* programs in Spectrum format.



At last — a real gem

'Interpolate' is an excellent program and probably the most useful in the book. Data is entered on two program lines; the program very cleverly scales it to fit the screen area and interpolates between a certain number of points by drawing the lines between them. It is quite fast, too; and what's more, there are hardly any mistakes in the text!

The next section is titled 'Using the Video memory'. A slightly strange title, to be sure, since only one of the programs in it does directly access the video memory.

'Hi-res cursor' allows the user to move a small cross around the screen. The key choice (5,6,7,8) was a bit mysterious until I realised that these correspond to the cursor arrows on the Spectrum keyboard! 'Hi-Res Cursor 2' is similar, except it does not erase the background.

'Character building' allows you to create your own characters very easily on a grid and then adds handy DATA statements to the end of the program. Nice and very useful. It is one of the few programs in the book which have been written specifically for the Vic.

The text says that the program will not run with the Super Expander cartridge in place (what about the blue sticker?). The reason is that memory pointers are changed to accommodate the function key definitions. But there are solutions. Simply type:

POKE 642,4: POKE 643,0: POKE 644,30:POKE 648,30: SYS 64824

... and the program should work with **any** memory configuration and **without** removing the Super Expander.

The next section is on scaling and stretching.'Scale 1' allows you to specify the scaling factor of a shape and the Vic will then draw the new shape: a useful enough demonstration of dilation (that's what they call it in school). I suppose the piece of text which reads 'S⅟1' should read 'S=1'. 'Scale 2' is similar to 'Scale 1' except the centre of dilatation is at the centre of the shape. Again, useful in the classroom.

'Stretch 1' only allows the user to stretch the shape parallel to the X and Y axes while 'Stretch 2' allows you to stretch the shape along any angle. It is quite a complicated program; and the author tells us "many excellent books have been written on the subject" (but which books?).

Moving on

The first program in the 'Rotating and Moving' section is called 'Rotate'. We are told that the program rotates a cross around a central point. Actually the cross does *not* rotate around the central point simply because it always remains parallel to the axes. It is not *true* rotation around a point, merely a circular movement of the cross.

On the other hand, 'Rotate 2' does perform true rotation around a point. This time a line is rotated and we can see that all the lines would pass through one point. 'Rotate 3' is an excellent example of true rotation. It allows the user to alter the shape, central coordinates and angle of rotation. Definitely of use as a teaching aid.

And now to the last exciting section on '3D Displays.' They are not true 3D display programs, of course: they only represent 3D objects in two dimensions (your TV screen). The programs use some very complicated mathematics — but thankfully this time the author refers us to a textbook.

Last words

My conclusion? *Vic Graphics* is a rehash of *Spectrum Graphics* to the point that in places the text has been modified only to read 'Vic' instead of 'Spectrum'. Mr Hampshire, this is not good enough!

What's worse, this means that the programs do not use the Vic's maximum graphics display potential: and as a result there are not many outstanding programs in the book.

It also leads to inefficient programming. This is the main cause of most of the errors in the text.

I cannot dismiss the fact though that *all* the programs work; and to most people this is of primary importance. The book is *not* an introduction to techniques but a demonstration of them — though many useful routines can be salvaged from the programs such as the input routine.

All in all, *Vic Graphics* is *not* an introduction to techniques but a demonstration of them — though many useful routines can be salvaged from the programs such as the input routine.



The Complete Beginner's Guide to Assembly Language Part 3

by David Pinless

The 6502 microprocessor inside the Vic understands 56 different instructions, many of which have more than one addressing mode. What's an addressing mode? Well, it's a means of specifying, by the code of an instruction, the location of the operand on which the opcode is to operate!

Implied

If we learn a few assembly language instructions, and examine their addressing modes, all will become clear.

First, let's consider TAX (no, don't clutch your wallet) – it means Transfer the contents of the Accumulator into the X register. This is a one-byte instruction specifying an internal transfer between two registers within the 6502 itself. The instruction has a hex code of AA (decimal 170) and uses the **implied addressing** mode only – there is no operand, because the location of the data is implicit in the opcode.

A similar addressing mode, not used by TAX is called 'accumulator addressing' and operates exclusively on the contents of the accumulator.

Immediate

Now, assembly language instructions come in two parts – the *opcode* and the *operand.* The opcode is the instruction itself, the operand is either a number or an address.

You will probably never write an assembly language program without using LDA (Load the Accumulator), but what do you load the accumulator *with*? Well, suppose you wished to load it with the number 46. The instruction is ...

LDA #$2E

... and it occupies two bytes, the first of which contains hex A9. That is the opcode for LDA using **immediate addressing**, where the operand is a constant (0 to 255) that immediately follows it; and the second byte is the operand 2E, the hex equivalent of 46 decimal. '#' means number and '$' means the number is hex.

Absolutely!

If you want to load the accumulator with the contents of an address – 65534, say – the instruction is ...

LDA $FFFE

... and occupies three bytes. Byte one contains hex AD, the opcode for LDA using absolute addressing (where the operand is the full address at which the data is to be found). The second two are the address with low-order byte specified first. So the full sequence of bytes is:

(hex AD : FE : FF)

The 6502 requires all addresses to be formatted this way; VICMON lets you type the address the proper way round and assembles it for the 6502 as above.

You can see that one instruction will have different codes depending on the addressing mode. Your assembler will know which addressing mode you intend when you type LDA, by the way you express the operand (#$2E or $FFFE).

To continue our journey through the addressing modes, there is another called **zero page** (remember what a page is?) which is like the absolute mode – but only two bytes are required. That's because the operand can be specified with one byte only; it's an address between locations 0 and 255 in page zero. For example:

LDA $3A
(hex A5 : 3A)

This will load the accumulator with the contents of memory location 58.

Zero page addressing is more efficient in terms of speed than absolute, since it uses two bytes instead of three; but beware – your Basic interpreter likes most of page zero for itself and will not take kindly to your interference!

Indexed

STA is another assembly language instruction. It STores the contents of the Accumulator, and again has more than one addressing mode.

We'll use it to demonstrate two of them, **indexed absolute X** and **indexed absolute Y**. Both are similar to absolute, but the address where the data is to be found is computed by summing the absolute address (the operand) and the contents of the X or Y index register. For example, this lot ...

STA $01FF,X
(hex 9D : FF : 01)
STA $01FF,Y
(hex 99 : FF : 01)

... will cause the contents of the accumulator to be copied into memory at locations 01FF *plus* the contents of the X and Y index register as appropriate. This addressing mode is useful for storing data in a table of successive memory locations.

It probably won't surprise you to learn of two more addressing modes, **indexed zero page X** and **indexed zero page Y** which require only two bytes; indexed zero page Y though, is rarely used as it is only available for a couple of instructions.

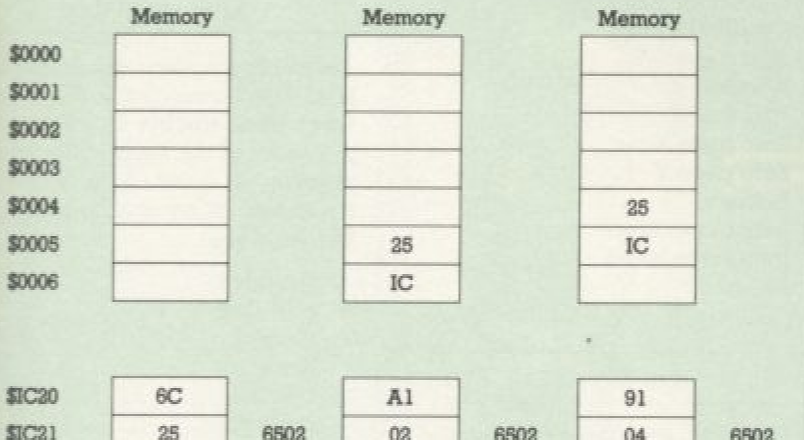
You must be beginning to think that we have exhausted addressing modes, but there are more on the way. We've just learned the easy ones; before reading about the next few, I strongly recommend you have a bottle of whisky or aspirin at hand (but not both, the editor will not accept liability ...)

Very Indirect

The first isn't too bad; it's called **indirect addressing**. Here the operand is an address, as with ab-

Diagram 1

Illustration of 6502 Indirect Addressing Modes



In each case the opcode is in address $IC20



solute addressing; but instead of that address containing the data, it contains the address of where the data is to be found itself. For example:

JMP ($FFAA)
(hex 6C : AA : FF)

JMP means (you guessed it) JuMP, and is the only instruction that uses this addressing mode. In the example, the program will jump to a location whose low-order byte is the contents of FFAA and whose high-order byte is holding the contents of FFAB. Diagram 1 illustrates the principle of this and the next two addressing modes.

Indexed indirect addressing makes use of the X index register and page zero. An instruction using this mode looks like this ...

LDA ($A9,X)
(HEX A1 : A9)

... and it means:

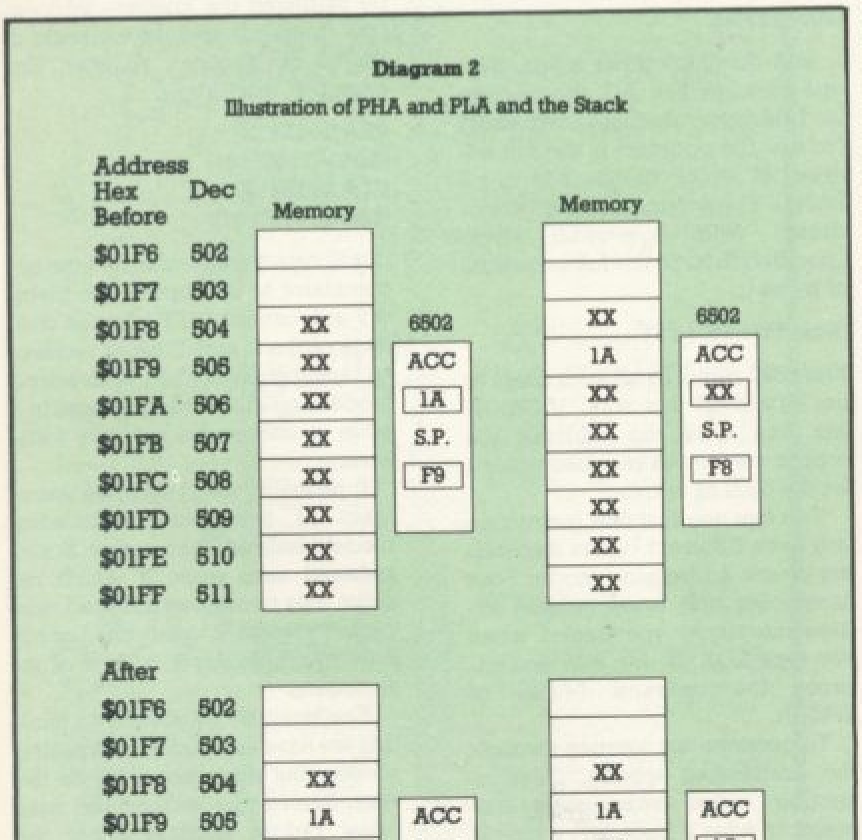
- Add A9 and the contents of the X register, say 04
- Go to this address, 00AD, and note the contents, say 32
- Note the contents of the adjacent address, 00AE, say 1C
- Now load the accumulator with the contents of address 1C32

Indirect indexed addressing makes use of the Y index register and page zero. An instruction using this mode is ...

LDA ($A9),Y
(hex B1 : A9)

... which executes as follows:

- Go to address 00A9 and note its contents, say 50
- Note the contents of the adjacent address, 00AA, say 2E
- Form the address 2E50 and add the contents of the Y index register, say 05
- Load the accumulator with the contents of address 2E55



Whew! Diagram 1 should help you to understand this apparently complex addressing mode. It doesn't exist to make life unnecessarily difficult, but so that we can use pointers (the indirect access) to refer to tables of data. So if the pointer is changed, another table is accessed.

Relatively Speaking

Don't give up – there's only one more: **relative addressing**. It's only used by branch instructions such as BNE (Branch if Not Equal to zero) and the instruction says that the program is to branch to a new address which is computed as the sum of the address next but one forwards from the BNE instruction and its one-byte operand. Bits 0-6 of the operand represent the magnitude of the displacement, bit 7 gives the sign (0 = plus, 1 = minus). The BNE instruction tests the zero flag in the status register to decide whether the branch is to take place or not.

To sum up, we've just covered all thirteen addressing modes of the 6502:

Implied
Accumulator
Immediate
Absolute
Zero page
Absolute X
Absolute Y
Zero page X
Zero page Y
Indirect
Indexed indirect
Indirect indexed
Relative

The Stack

And now for something completely different. Did you ever wonder, in your Basic days, how the Vic remembered from where in your program you called a subroutine with GOSUB, so that when the RETURN statement was encountered the program returned to the correct place? I didn't either, but it's achieved by having a temporary storage area in memory called the **stack**.

In the case of the 6502 this storage area occupies all of page one – ie locations 256 to 511 – and is arranged on a LIFO (last in, first out) basis. This means that the data last placed on the stack will be the first to be removed. The stack is implemented from the bottom up; the first location to be used will be 511, then 510, and so on. If you fill up the stack when using Basic an ?OUT OF MEMORY error message will appear, even though you might have many free bytes left.

There is a special register inside the 6502 called the **stack pointer** whose contents are the next available location in the stack. The register is effectively nine bits wide, the most significant bit being permanently set to 1 so that the contents always point to a page-one location.

To see how this works, we'll examine two assembly language instructions: PHA (PusH the contents of the Accumulator onto the stack) and PLA (PulL the contents of the stack onto the Accumulator).

Look at diagram 2 – the stack already has some numbers on it; and the stack pointer inside the 6502 is pointing to the next available location, 01F9. When the instruction PHA is encountered, the contents of the accumulator are copied on to the stack at location 01F9 and the stack pointer is decremented to point to the next available location. When a PLA is executed, the stack pointer is the first incremented to 01F9 and the contents of this location are copied into the accumulator. Location 01F9 is now the next available location, and the stack pointer already points to it.

Mnemonics

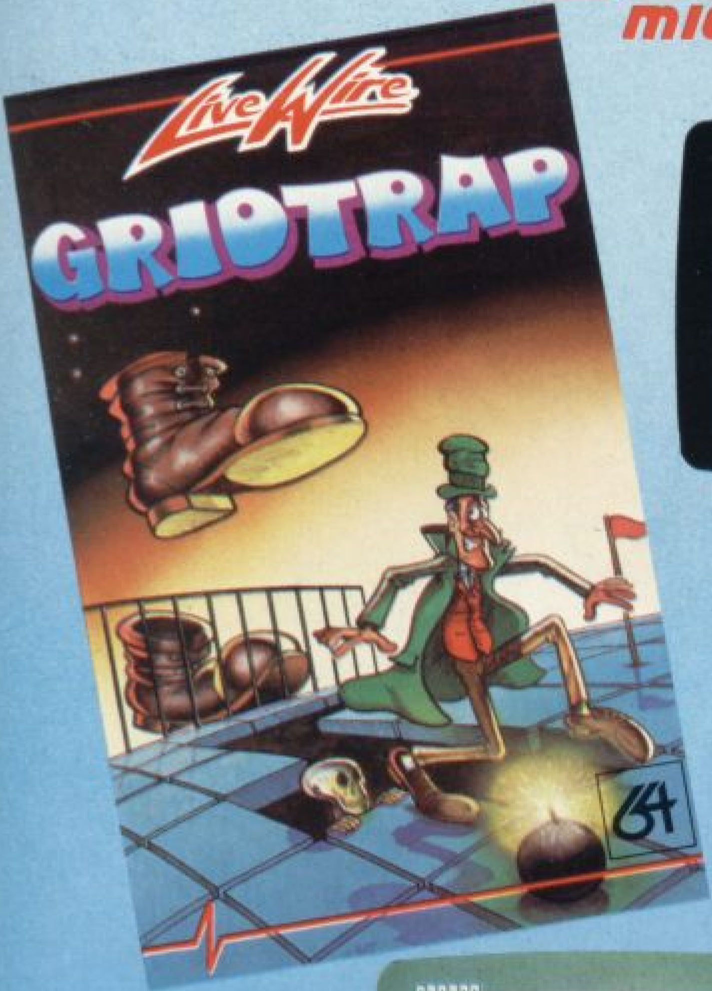
Assembly-language programming is all about mnemonics. Since I always have trouble remembering the order of the flags in the status register, I decided to invent a mnemonic of my own to help me. The flags are:

- Negative
- oVerflow
- Unused
- Break
- Decimal
- Interrupt
- Zero
- Carry

(The 'Z' caused me problems, but how about Naughty Vampires Undress Before Digging Into Zer Clients. Oh well, better solutions on a postcard please.)

Finally, when writing your programs, did you know that you can incorporate some of the machine-code subroutines already hardwired into your ROM? When you're ending a session with your Vic and you're in the hands of the Basic interpreter, type SYS64802 and see what happens. In the next issue of *Commodore User* there will be a handy pull-out of all the 6502 instructions and their codes, so see you then.

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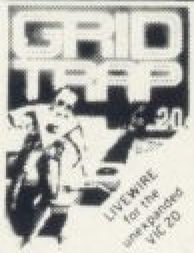
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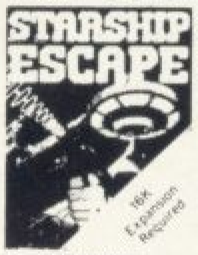
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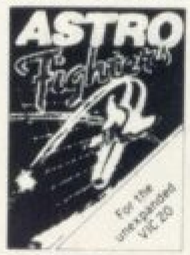
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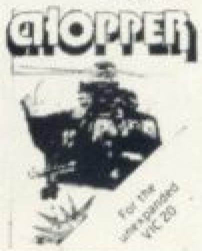
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Commodore 64 Video a guided tour: part 1



by Jim Butterfield

We're about to embark on a guided tour of the 6566 chip, which gives the Commodore 64 its video. It's called the VIC, for Video Interface Chip, that's the same name used for the 6560 used for the VIC computer, but the 6566 is a whole new story.

Before setting off on our expedition, we need to establish a few landmarks which will place the chip within the Commodore 64 architecture.

Memory and Video

The 6566 chip relates to memory in two ways. First, the chip's control registers are accessible in addresses 53248 to 53294 – or if you'd rather, hexadecimal D000 to D02E. We'll change these registers if we want to change the behaviour of the chip.

The chip itself looks directly into memory as it generates video. It is usually looking for at least two things: what characters to display, and how to display them.

It finds what characters to display in an area called 'screen memory' or, more formally, the 'video matrix'. It finds out how to display the characters by looking at the 'character generator' table, or the 'character base'.

Since the chip generates a lot of video, it looks at memory a great deal. Most of the time it can do this without interfering with the processor's use of memory; but every 500 microseconds or so, it needs to stop the processor briefly in order to get extra information.

This doesn't hurt anything: the pause is so short that we don't lose much processing time. But occasionally the microprocessor is engaged in timing a critical event, and does not want to be interrupted. In this case, it shuts off the 6566 chip until the delicate work is over. Ever wondered why the screen blanks when you read or write cassette tape? To give the computer an extra edge while timing tape, that's why.

Charting the 64

When the video chip goes to memory for its information, it has a special problem: it can only reach 16K of memory. That's OK for most work.

For example, the screen (or video matrix) is usually located at 1024 to 2023 (hex 0400 to 07E7), so we'll use it there. But if we wanted to move screen memory to a new location, say 33792, we would need to work out some details since the chip would not normally be able to reach addresses so high in memory.

We are given some help in doing this by the 64 architecture itself. There are two control lines called VA15 and VA14 which allow us to select which block of 16K memory we want the video chip to use. Note that once we've selected a block, the chip must get all its information from that block: we can't mix and match.

The control lines are available in address 56576 (hex DD00) as the two low order bits. The memory maps you get are:

- **POKE 56576,4** . . . the chip sees RAM from 49152 to 65535. There's no character generator; you'll have to make your own.
- **POKE 56576,5** . . . the chip sees RAM from 32768 to 36863 and from 40960 to 49151. The ROM character generator is in the slot from 36864 to 40959.
- **POKE 56576,6** . . . the chip sees RAM from 16384 to 32767. No character generator.
- **POKE 56576,7** . . . the chip sees RAM from 0 to 4095, and from 8192 to 16383. The ROM character generator is in the slot from 4096 to 8191. This is the normal Commodore 64 setup.

Note that the chip never has access to RAM at addresses 4096 to 8191 and 36864 to 40959. You will not be able to put screen memory or sprites there.

Be careful with these. If you move the chip's memory area, you'd better be sure to move the screen. For example, try the following:

POKE 648,132: POKE 56576,5

You'll find yourself transferred to a new, alternate, screen. The new screen will be 'dirty' – it hasn't been cleaned up. Typing a screen clear will make things look neat and you may then play around with an apparently normal machine. When you're finished, turn the power off for a moment to restore your machine to the standard configuration.

The Chip: Video Control

Now for the 6566 chip itself. We'll go through the registers, but not in strict numeric order.

Location 53265 (hex D011) is an important control location. It contains many functions; its normal vlaue is 27 decimal.

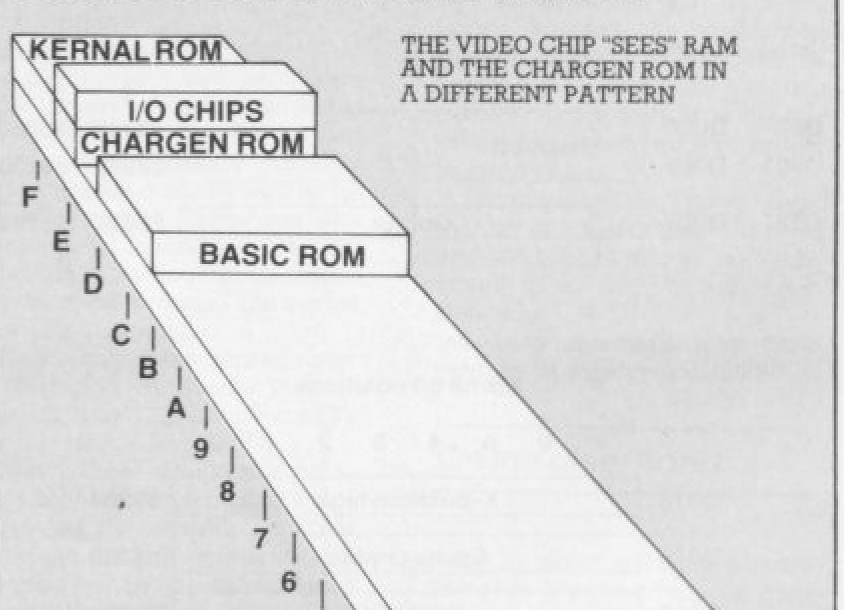
Values from 24 to 31 control the vertical positioning of the characters on the screen. Try this:

FOR J=24 TO 31: POKE 53265, J: NEXT J

You'll see the screen move vertically, leaving an empty spot near the top. POKE 53265 back to 27.

If we subtract 8 from the value in the 6566, the screen will lose a line: instead of 25 lines we'll have only 24. The best way to see this is to clear the screen; write TOP on the top line, BOTTOM on the bottom line (don't press RETURN!); then move the cursor

COMMODORE 64 ARCHITECTURE



to about the middle of the screen and type . . .

POKE 53265,19

You'll see the top and bottom trimmed to half a line each.

Think about using these two features together. If we have a screen full of information, we would normally scroll when we wanted to write more – the characters would jump up a line. But if we can switch to 24 lines, slide the characters up gently, and then switch back to 25 lines, we'd have a smo-o-o-oth scroll.

POKE 53265 back to 27

If we subtract 16 from this location, we'll blank the screen. We mentioned this before: it will give the processor a little more accuracy in timing.

In fact, this POKE is the key to allowing us to LOAD a program from an old-style 1540 disk unit. If the disk hasn't been modified, it will deliver bits slightly too fast for the computer . . . but we can bridge the gap with **POKE 53265,11:LOAD . . .** and the loading will take place successfully. When the load is complete, we can get the screen back with **POKE 53265,27.**

High Resolution

The next control bit – value 32 – switches the display to pure bits. No more characters: the screen will be purely pixels as we switch to high-resolution mode. We'll use a lot of memory for this one: memory to feed the screen will be 8,000 bytes.

High resolution needs to be carefully set up, but let's plunge right into it. Type **POKE 53265,59** and you'll see an intricate pattern on the screen. What you are looking at now is a bit map of RAM memory addresses 0 to 4096, plus the character generator area.

The top of the screen will twinkle a little: those are the page zero values changing – things like the real time clock and interrupt values are constantly in motion.

In the bottom half of the screen, we'll see the character generator itself. Oddly enough, the characters are readable. That's because of the way high-resolution bit mapping works: each sequence of eight consecutive bytes maps *into a character space,* not *across the screen* as you might think.

We're going to play around a little. First, clear the screen. Surprise! It doesn't clear, but the colours change. That's because screen memory, into which we are typing, holds colour information for the high resolution screen.

Now, we'll clean out a band of hi-res data by typing in a Basic line. We must do this blind; the screen won't help us. Type:

FOR J=3200 TO 3519: POKE J,0: NEXT J

If you've typed correctly, you'll see a blank band across the screen. Don't worry about the colour change as you type. Now we'll enter (blind again):

FOR J=3204 TO 3519 STEP 8: POKE J, 255: NEXT J

You should see a high-resolution line drawn across the screen.

That's all the high resolution fun we're going to have this session, but you may be starting to get an idea of what's going on. Turn off the power, and let's look at other things.

Extended Colour

If we add 64 to the contents of 53265, we'll invoke the extended colour mode. This will allow us to choose both background and foreground colours for each character. Normally, we may only choose the foreground: the background stays the same throughout the screen. You lose some colours, but get better combinations.

Try **POKE 35265,91.** Nothing happens, except that the cursor disappears . . . or at least becomes less visible. Why? We've traded the screen reverse feature for a new background colour.

Try typing characters in reverse font, and see what happens. Try choosing some of the specilalized colours – the ones you generate with the Commodore key rather than CTRL. See how you like the effect. Think how you might be able to use it.

Extended colour is purely a screen display phenomenon. **POKE 35265,27** will bring all the characters you have typed back to their normal appearance.

The High Bit

There's one more bit in location 53265, the one we would get if we added 128. Don't do this now: this bit is part of a value we'll discuss later, the 'raster value'. You won't use this one out of Basic, but it can be handy at machine-language speeds.

Tune In Again

We've done a lot of things so far . . . using only one control location. There are more locations, and we'll discuss some of them next time.

It's a big chip. It will take a lot of time to digest all its possibilities. It's fun, and it can create remarkable effects.

6566 Video – Sprite Registers

Sprite 0	Sprite 7			Sprite 0	Sprite 7
D000	D00E	Position	X	53248	53262
D001	D00F	Position	Y	53249	53263
D027	D02E	Colour		53287	53294

Sprite bit positions

7 6 5 4 3 2 1 0

D010	X-position high	53264
D015	Sprite enable	53269
D017	Y-expand	53271
D01B	Background priority	53275
D01C	Multicolour	53276
D01D	X-expand	53277
D01E	Interrupt: sprite collision	53276
D01F	Interrupt: sprite/background collision	53279

6566 Video – Control and Misc. Registers

D011		Extend Colour	Bit Map	Display Enable	Row Select	Y-scroll	53265
D012	Raster register						53266
D013	Light Pen input					X	53267
D014	Light Pen input					Y	53268
D016	X		Reset	Multi-Colour	Column Select	X-scroll	53270

D018	Screen (Video Matrix) vm13, vm12, vm11, vm10	Character Base cb13, cb12, cb11	X	53272
D019	IRQ / IRQ sense	LP, SSC, SBC	RST	53273
	IRQ enable	Light Pen, Collision Sprite, Back	Rastr	53274

Colour Registers

D020	Exterior	53280
D021	Background no. 0	53281
D022	Background no. 1	53282
D023	Background no. 2	53283
D024	Background no. 3	53284
D025	Sprite Multicolour no. 0	53285
D026	Sprite Multicolour no. 1	53286

Pre-Xmas Thoughts

Printer Progress

The story so far: tanned from a quick stopover to advise Peter de Savery and a noontime exchange of Ugandan confidences with M—— W—— in Mustique following the biennial visit to his extensive llama ranch outside Ulan Bator, the oil wells he's selling in Texas and the line miles of Cannes sea-front onto which he's just franchised MacDonalds, Average Reader J D Collins gives a sly knowing smile as he seats himself in front of the Vic and presses the ON switch one more time . . .

Progress so far seems to have been three steps forward and two steps back, but with some yet unfulfilled promises of great things afoot. As a result of an unspeakable pact with the Dark Powers a Commodore 1540 disk drive recently manifested itself upon my Vic-desk (an old school typing desk, with drawers, and rising desk levels: £15, beat that!)

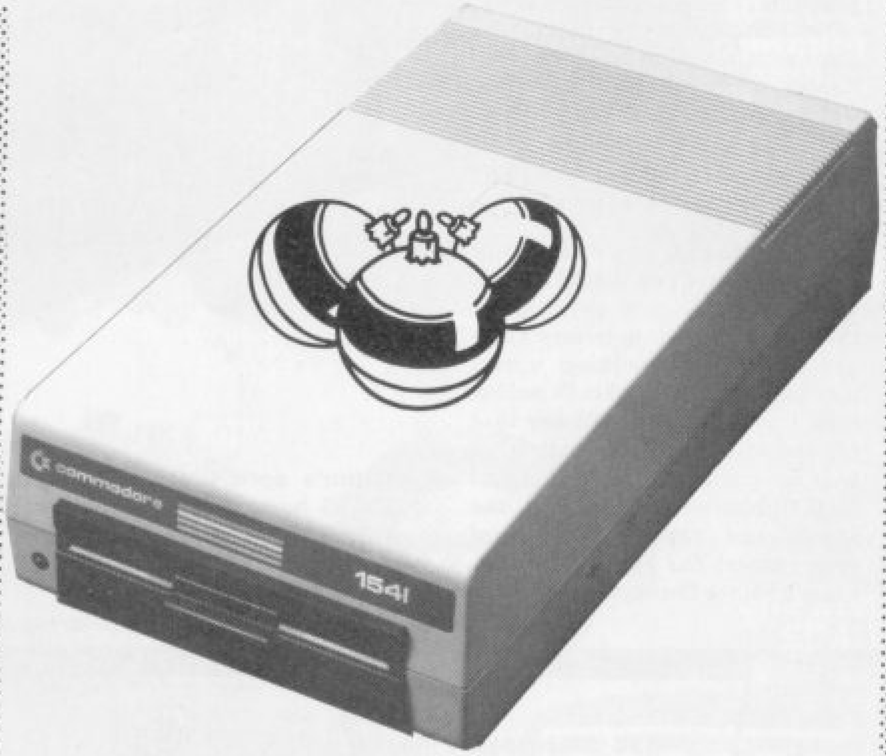
Cackling with glee I prepared to unleash the full power of the Vic, but like all demonic pacts mine had a sting in the tail . . . it didn't work. For a start the manual might as well have been written in Sanskrit for all the sense it made to me. The Marketing Division of the Sirius Cybernetics Corporation must have laboured long into the night to produce a thing like this. Do not under any circumstances do what it tells you to or TERRIBLE THINGS will happen!

First ensure that you buy from a dealer you can get to within half a day's travel; then make sure he demonstrates all the essential functions and commands, *and* the demonstration disk routines, *and* can supply crucifix and garlic cloves if necessary before you part with your talismans. You may find a bottle or two of 'holy' water will ease the nerves once you turn on the power . . .

Unprotected as I was, all my conjurations failed to make the beast perform and it was only when I communed with the powers at **Commdore User** that the lovely Annabel interceded for me and performed the required genuflections; it worked!

. . . But not for long. My spare room must have been the focus of malign cosmic forces because a few days later it stopped again. I tried several kinds of ritual offerings (did you know it only likes certain kinds of disks?) to no effect. When it spat out a hellishly expensive disk I had bought in desperation, and starting emitting truly awful noises, I finally gave up. My 1540 disk drive is now in the hands of a professional exorcist.

Unskilled as I am in the arcane arts (our Editor will confirm my dreadful spelling) (*true – Ed*). I did consult certain Earthly powers during these events – though Commodore Towers is almost as hard to contact as the Nether Regions – and eventually spoke to a very friendly chap in Commodores' Technical Enquiries Dept.



Now here is the point of my sorry story. I was told that the Vic 20 has a whole set of hardware – checking routines built into its ROM. They only come into operation if you have some rare and wonderful extra like Hyper-Space Warps and double-disk drives etc. But if non-standard RAM is plugged in, it lacks certain chiplets and can't talk to these routines properly; thus causing an error condition to occur. This also happens if non-standard printers, or anything non-Commodore is on line with the Vic. Do I hear groans of dawning realisation from someone?

Pay attention!

At the time I didn't have any of these sordid unofficial things anyway so I didn't pay much attention: it was after all the proper disk drive.

I was soon to recall this little titbit.

No sooner had the disk drive been banished than another little cursing in disguise materialised . . . a non-standard RAM pack! Now, I shall mention names here because I think it is important to others who are, like me, seeking an inexpensive route through the hardware jungle to a productive home computer system. To be fair I will instantly report developments. The pack I speak of was the 16K RAM from Startech.

This RAM pack appeared, as you might expect from a pact with Dark Powers, in matt black plastic. "Whoopy!", I thought. Word Processing Databases, devilishly (Ha!) complex games would all be at my command. Trembling with excitement I loaded my specially acquired Audiogenic *Grand Master* chess program and settled down for the evening.

Lack a day! A few seconds after it started it crashed. Then it crashed again. Third time unlucky it still crashed.

Now I know what you're thinking, but you're wrong: I tried it on a borrowed Commodore 16K RAM pack and the one from Stonechip Electronics. So I know *Grand Master* works (it is really very good – I'll tell more another time).

The interesting thing is that with the Startech RAM it didn't just crash – it crashed with a rather pretty graphic display. Or were those squiggles a message from the Twilight Zone? Experiments with other programs produced varying results; *Trader* and *Subspace Striker* from Quicksilva worked fine, but *Starship Escape* from Sumlock and ***8K Kosmic Kamikasi*** from Audiogenic both crashed with the same obscure screen display after a few seconds of play.

Again, use with the other RAM packs I had borrowed produced no problems. The ghostly words of Commodore's engineer echoed through the gathering gloom as I packed off the RAM pack back to Startech.

All right, so I got a rogue RAM. But a snatch of gossip from a certain well-known Vic 20 peripheral manufacturer at the last Commodore Show makes me wonder. It seems that independent manufacturers have a tough time wringing technical details out of Commodore; so maybe those secret chiplets were to blame after all?

I do not like this idea. If Commodore really is so unhelpful, it is we customers that get the problems. It is such a shame when the Vic has so many good things going for it.

It can be a bit embarrassing too, as some of my colleagues at work are thinking of buying a computer for their kids and I get asked my opinion on which one is best. I agree I am not really experienced enough to qualify as competent to judge; but I do think the Vic is up there with the best. It is hard to enthuse though when your system has gone kaput.

Having said that, I have talked owners of some of the Vic's rivals and the tales of sorrow I've heard would bring tears to your eyes. Heh heh.

So, any comments from Commodore User's technical folk???

On the other hand . . .

All is not gloom and despondency, however. My Good Fairy has done her best against the Lords of Chaos and produced some goodies to cheer me up. The first of these was my own Magic Wand – the Stack Light Pen.

It is rather a fun thing to impress the gang with, makes you look really professional as you point your wand and make things go.

Printers Progress

You get the pen and a game and some instructions on how to use the light pen in your own programs. I haven't really had time to evaluate the thing properly so I'll save further comment for a later date.

The next goodie was the Commodore Programmer's Aid Cartridge – a pricey bit of silicon, but what a joy to use! Even for an inexpert dabbler in programs like me it is a pity that it can't be used at the same time as the Super Expander; but I suppose you can't have everything.

Some of the facilities I found to be unnecessary, like the use of function keys, but that is probably just the way I personally use it. And I think it is expensive if you just need the commands such as Trace or Renumber. But none of the other 'programmers aid' utilities have all the commands available on this product. On balance I think it's worth it; maybe I'll say more another time.

Last but not least, the Super Expander has entered my life. Now here is a juicy little number. In my humble opinion, when combined with the Vic's other features (and a bit of extra RAM) this puts the VIC ahead of most of its rivals.

I suppose it will be a while before there are enough Vic users with this super Expander to make it worthwhile for the software houses to issue programs that use its capabilities: but that has to be the next step.

Anyway, the Super Expander is a whole lot of fun. And though I again haven't really had time to get to grips with it I did run the *Komputer Kaleidoscope* program from **Vic Computing** August 82 – and watched the results through four Kraftwerk LPs, much to the annoyance of the rest of the household!

With all this lot you'd think my cup runneth over. Well, yes it does; but I'll have to get some of the slops cleared up before I can get down to something useful like cataloguing my Sci Fi books. Will I ever do it? I will say that for the few hours my disk drive was in operation I really did feel as if things were happening, the speed and capacity are most impressive! Yar boo suks to Sinclair's Micro Drive!



Editor's note: Startech, who at £28.95 had one of the cheapest 16K RAM expansion cartridges around, have ceased trading. Sic transit etc.



Merry Xmas y'all JD

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TERMINAL SOFTWARE
commodore 64 games cassettes
SUPER SKRAMBLE!
Personal Computer News (15-21 Sept '83) gave SUPER SKRAMBLE! an overall rating of NINETEEN OUT OF TWENTY and described it as: "Well implemented with beautifully smooth scrolling and very nice graphics."
SUPER GRIDDER
". . . a compelling piece of frivolity that could give hours of fun." was the verdict of Personal Computer News (22-28 Sept '83).
SUPER SKRAMBLE!
"An excellent game" said Computer & Video Games magazine (Sept '83).
SUPER DOGFIGHT
The first 64 games cassette to have SIMULTANEOUS TWO-PLAYER ACTION – realistic sound effects too.
TERMINAL
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A game of skill and anticipation in which you must dodge your way through asteroids to complete your mission.
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TOMMY'S TIPS



Congratulations to Mr. F. L. Ellis for spotting my mistake in the August 1983 column. To test if A and B differ by less than one millionth I suggested ...

IF ABS (A+B) > 10E−6

Of course I should have said ...

IF ABS (A−B) > 1E −6

Just shows that not even Tommy is perfect. Well not all the time anyway.

***Dear Tommy,* I have been trying to write an educational program to find r items from n and put the result into alphabetical order. For instance, I've tried to find a way of getting eight letters from A to J and put them into alphabetical order. Are there any books giving mathematical programs rather than games? I mean things like evaluating a determinant, multiplying matrices etc. Some of these are not too difficult, but others are quite beyond the likes of me.**

Your first problem has two parts: selecting the items from the list, and then arranging them in order. (a process which is usually called *sorting*). I cannot help with the first, because you do not explain how you want the elements to be chosen – whether at random, selected from the keyboard, or by some other method.

As for the sorting, here is a routine for the simplest (and slowest) of all sorts – the Bubble Sort. It assumes that you have R items to sort, in an array A$(), from A$(1) to A$(R):

```
100 N = R
110 J = 0
120 FOR I = 1 TO N
130 IF A$(I) > A$(I+1) THEN Z$
    = A$(R): A$(R) = A$(R+1):
    A$(R+1) = Z$: J = 1
140 NEXT
150 IF  J=1  THEN  N=N−1:
    GOTO 110
```

Briefly this is how it works: N is originally set to R, the number of items to be sorted. The loop from lines 120 to 140 actually carries out the sort. J is 0 at the start of each loop, and it's set to one if two items are swapped over – so if J still equals 0 at the end of the loop, all the items are in the correct order.

Line 130 compares two adjacent items. If the first one is larger, it swaps them over and sets J to 1. This means that the largest item in the array will rise up the list like a bubble in a glass of lemonade (hence the name of the sort).

At the end of the first 'pass' the largest item in the list will be at the top of the list, so we only need to check N−1 items next time. That means we decrement N by one after each pass.

This sort is quite good for small numbers of items (less than 100, say), but it gets very slow for large numbers of items.

As for your mathematical problems, **Commodore User** is coincidentally reviewing a book called *Basic Subroutines for Commodore Computers* by Eddie Adams, published by Wiley Press. It includes a wealth of programs from simple conversions to matrix operations and statistics. Our report will be out soon, but it does look rather good.

Don't forget that if you can solve your problems using a pen and paper, you *should* be able to write the same equations into the computer; but of course it does involve some work. Computer scientists spend vast amounts of time trying to discover new algorithms to solve problems faster, but all you want is a simple program which works ... unless your determinant is 5000 × 5000 elements, in which case you will need a bigger computer than a Vic!

***Dear Tommy,* with Chris Durham's adaption (December 1982) to the Arfon Expander in place, does one have to switch off the Arfon itself or just the slot, when inserting or removing the cartridges? And, when switching the cartridges on or off, is it necessary to switch the Arfon off?**

When cartridges are inserted or removed, the mains switch on the Arfon unit should always be turned off. The reason is that while cartridges could be switched off while the Vic-20 was still on, the computer would have no way of knowing that the cartridge was no longer present. In order to allow the computer to reorganise itself correctly the main power supply should always be switched off when changing anything on the expansion board.

One word of warning; although switching a cartridge on and off without turning off the main power will not harm the cartridge, under no circumstances should cartridges be removed or inserted with the power on as this could damage them irrepairably.

***Dear Tommy,* I've got a question concerning a couple of the Vic's Kernal routines, namely LOAD and SAVE. I can't get the Vic to do a relocated LOAD from a machine-code program. I am confused by the fact that in the *Programmer's Reference Guide* it first says that for a relocated load the secondary address used to OPEN the file should be 0. It then says that if the secondary address is 0, 1 or 2 the memory will be loaded back where it came from!**

By the way, on a totally different subject, when the magazine says it will accept programs etc. on an "all rights" basis, what exactly does that mean?

Before calling the LOAD routine you have to call SETLFS with the XR containing the file number, the YR containing the secondary address and the AC containing the device number. If the secondary address is zero you are all set for a relocating load; if it is non-zero, the program will load back into the same piece of memory from which it was saved.

For a relocating load, you specify the address where the program is to load by means of the XR (LSE) and YR (MSE) when you call LOAD.

"All rights" means we can use it again and again as often as we like, and can change it without asking your permission. (*A bit brutal, perhaps, but otherwise we'd never be able to tweak or edit anything – Editor.*)

***Dear Tommy,* I have used file reading and writing with great success, but have noted the following. Take the program:**

```
10 OPEN 1,1,0,"DATA"
20 INPUT #1,A,B,C
30 CLOSE 1
```

If I type 'GOTO 10' I get:

```
PRESS PLAY ON TAPE
OK
SEARCHING FOR DATA
FOUND DATA
READY
```

If I type 'RUN I' get:

```
PRESS PLAY ON TAPE
OK
READY
```

Both methods read the file

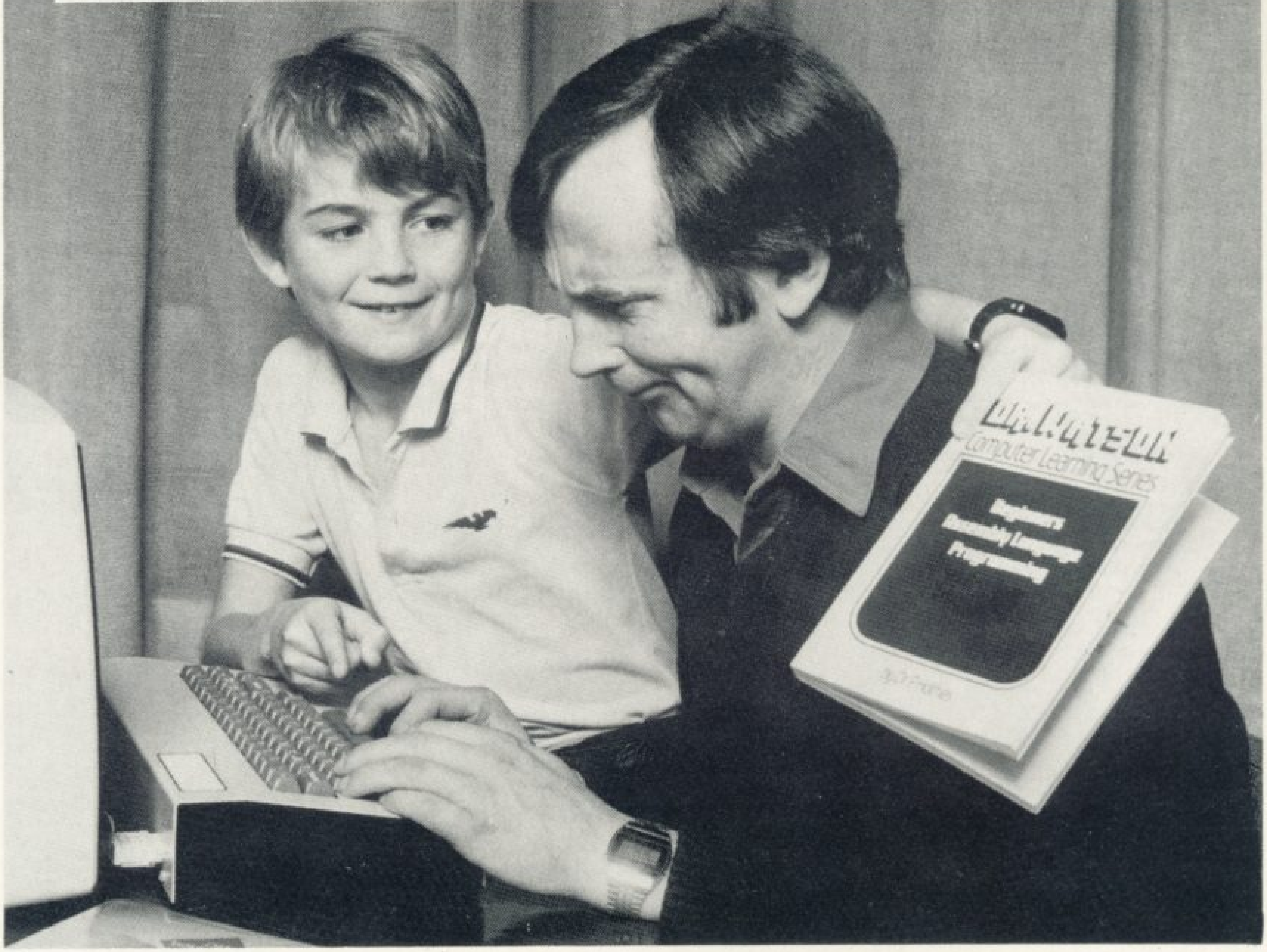
Many people who have fitted memory expansions are still writing to me about downgrading their Vics to allow them to run games intended for a Vic with a 3K expansion. This can be a little tricky, because if you add 3K, the start of memory moves from 1024 to location 4095, and the start of the Basic program goes from 4096 to 1024 to take advantage of the extra memory.

If you expand to say 16K, the extra memory starts from 8192 and the Basic program is stored from 4608 upwards, with the screen memory running from 4096 to 4607 ... which means that the area from 1024 to 4095 is *only* used in a 3K expansion.

The problem is that if you try to downgrade to +3K, and your expansion does not have any memory between 1024 and 4095, the system will crash – *regardless of how much memory you have from 8192 upwards.* Memories with the extra 3K may be called '19K expansion' or '16+3K expansion', but without it you cannot downgrade to +3K.


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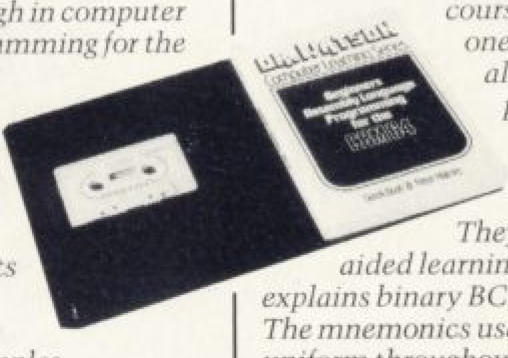
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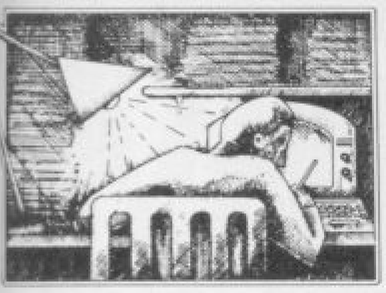
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Before you buy a micro – make sure Dr Watson has the course.



successfully, but it seems strange that the RUN command suppresses the system messages. Is there a way to retain the messages from a RUN program?

Location 157 (on the Vic or the 64) contains 128 when Basic is in direct mode and 0 when in deferred mode. After a GOTO, location 157 is left with 128; after a RUN it is set to 0. We can therefore get Basic to print out the messages after a RUN by having a line which says ...

120 POKE 157,128

How's that for a nice simple solution?

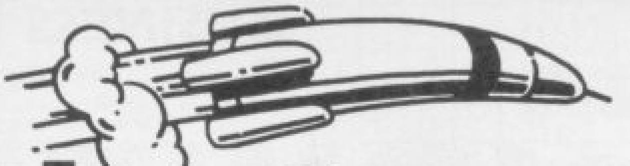
Dear Tommy, I have recently been programming on my Vic-20 when I struck a problem in saving. The computer saved the program, but when I asked for a VERIFY it acted as though I had a blank cassette: I got the SEARCHING message and the cassette just runs on to the end. Can you help?

The most common form of this problem is what we doctors call 'finger trouble'. Commodore computers do not check whether you have pressed the RECORD button, just that the tape deck motor is turning. It is very easy just to press PLAY, so that nothing is recorded - I know, because I have done it myself; and I'm sure that most other users have done so too.

It's also possible that you had a faulty tape. This is why it is best with a tape always to rewind the tape after saving a program, and verify it. If you then find a problem you can always try again with another LOAD command.

Of course, if you find that you cannot save any programs at all, your computer or your tape deck is faulty and you should consult your dealer.

Tommy



The Games Charts

The Top 20 Bestsellers for Commodore computers

These are our first Top 20 Charts for Vic and 64 programs. It's not a statistically valid exercise, of course; and (unlike some other computer magazines who do league tables) we wouldn't claim too much for it. But (a) it's interesting and (b) it is a fair indicator of what's selling well.

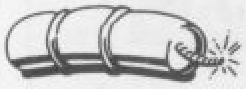
Why isn't it reliable? Because there are too many suppliers selling their games in too many different ways — mail order, chainstores, single department stores, through agents and distributors . . . What's more, no manufacturer is going to tell anyone exactly how many they've sold: why shoud they?

So what we did was to set up a panel of some two dozen retailers who stock a wide range of games and who are located around the country. So we think they're a pretty representative bunch. And we then called them all just before we went to press to ask for their own Top 20 list of bestsellers in the preceding month.

Putting those rankings together gives this list.



The Vic Chart



Position	Title	Supplier
1.	Sargon Chess	Commodore
2.	Catcher Snatcher	Imagine
3.	Lazer Zone	Llamasoft
4.	Escape	Rabbit
5.	Blitz	Commodore
6.	Choplifter	Audiogenic
7.	Super Lander	Commodore
8.	Alien	Commodore
9.	Tomb of Drewan	Commodore
10.	Mini Kong	Anirog
11.	Creepers	Virgin
12.	Amok	Audiogenic
13.	Alien Blitz	Audiogenic
14.	Gridrunner	Llamasoft
15.	Kactus	Audiogenic
16.	Matrix	Llamasoft
17.	Wizard & Princess	Melborne House
18.	Pirate Cove	Commodore
19.	Cosmic Crunchers	Commodroe
20.	Wacky Waiters	Imagine
Hovering:	Arcadia	Imagine
	Sky Hawk	Quicksilva

The 64 Chart

Position	Title	Supplier
1.	Gridrunner	Llamasoft
2.	Renaissance	Audiogenic
2.	Panic 64	Interceptor
4.	Sprite Man 64	Interceptor
5.	Souper Fruit	Commodore
6.	Lazer Zone	Llamasoft
7.	Crazy Kong 64	Interceptor
8.	Hovver Bovver	Llamasoft
9.	Frogrun	(Aimvog) Interceptor
10.	Tornado	Quicksilva
11.	Depth Charge	Commodore
12.	Falcon Patrol	Virgin
13.	Motor Mania	Audiogenic
14.	Labyrinth	Commodore
15.	Attack of Mutant Camels	Llamasoft
16.	Escape	Rabbit
17.	The Fabulous Wanda	Games Machine
18.	Grand Master	Audiogenic
19.	Super Blitz	Commodore
20.	Matrix	Llamasoft
Hovering:	Choplifter	Audiogenic
	Radar Ratrace	Commodore
	Stellar Wars	Commodore

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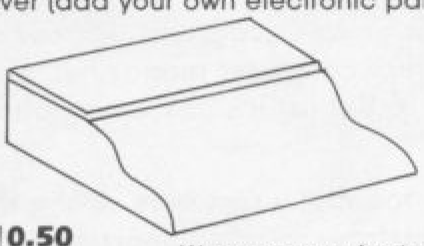
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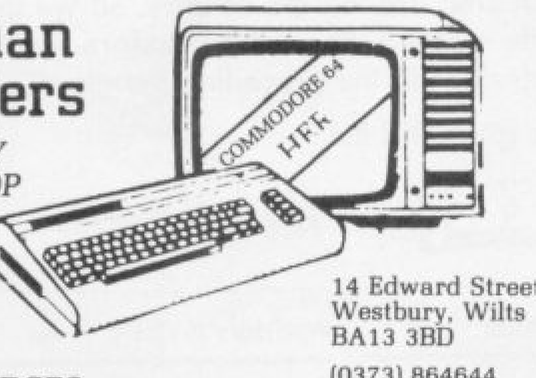
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Write away

This is your page: normally we write for you, but here we listen. Feel free to let us know what you think – about the magazine, about Commodore, about suppliers, about life, art, the meaning of existence or whatever. We don't print everything we receive, of course; but anything that might be of specific relevance or general interest will make it to these pages.

Technical matters get passed to Tommy for eventual emergence on the Tommy's Tips pages. But anything else ends up here. Address your comments, complaints, queries and congratulations to The Editor, Commodore User.

Whose magazine?

I feel that I must write before I cancel my Commodore User mag.

I have had a Vic-20 for 1½ years now, and seem to fall between two types of groups. The first: 'novice', which I now feel I have passed – but I have not reached the 'expert' level to which many of your articles seem to be directed.

I must be one of hundreds that first started out with the Vic-20, never having used a computer before, gradually working through different steps of learning.

So why am I writing? Well, what's in your mag for me, and the others in my group? Virtually *nothing*.

The technical stuff assumes you're at one with your machine. Don't you realise that your mag is something we look to to expand our knowledge, but in *gradual* steps?

It's made worse now by the 64. We have to sort through the magazine to see which articles are for Vic and which for 64.

I bet you lose a lot of your Vic readers now, including me.

May I suggest with respect:

a) Label each article clearly Vic-20 or 64 to save us reading half way through before discovering it's for the other machine.

b) Take us perhaps on a 'Beginner's Page' through different sections giving clear examples of each stage and explain what results to expect (eg DIM statements, ON GOTO, TI$, data files).

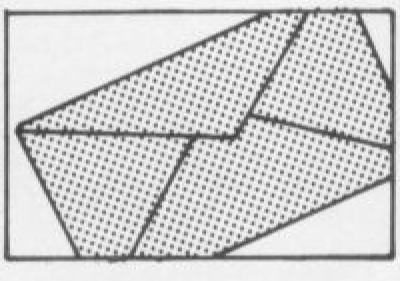
You may say these are covered in the manuals, but they are not fully explained with good working examples (not your problem, maybe, but we look to you for help).

c) You could start a file on routines for games, to be collected as a reference guide. Eg bounce a ball, fire routine, move a bat, and many others.

It's not difficult stuff as far as you are concerned when you are surrounded with the likes of Todd (if he's not telling us we can't configure to an extra 3K *again*!). Butterfield, Tommy and, no doubt, many others.

Unless I get more help I'll be saving for a BBC Micro ...

S.J. Poulter, 85 Farm Close, Bicester, Oxon.



Obviously this letter worries us here. It may well be that we've been losing sight of one of our original objectives, which was indeed to provide some hand-holding for relative beginners; in the early days of *Vic Computing*we always used to include at least a couple of articles along those lines, but editorially it's very easy to assume that because something was printed two years ago to attack the same subject again would be unnecessary repetition. Clearly there are many readers who wouldn't have seen the original articles. We have to rely on feedback from readers, but it's usually the advanced enthusiasts who write to us.

So we're taking this letter to heart. There are a number of ways in which the points you raise can be met by the magazine. One is a reprint of the previous low-end material, and as it happens there's a 'Best of Vic Computing' paperback on the stocks already which includes most of it. This we should be able to put out through the mag at a pretty modest price.

The suggestion about basic routines for games is good, and we are looking for someone to write a series of them. Would anyone out there like to volunteer? And how about some of you putting down on paper a list of ALL the things you've wanted do do yourselves to give us a starting point?

We're also attracted by your suggestion of detailed intros to Basic commands. As it happens we have already commissioned a series of some of them – DIM, SPC and TAB, and others. But that we can easily extend.

And from this issue we'll certainly be flagging articles more obviously as Vic or 64 information. A lot of what we print is of course applicable to *both* machines, but maybe that point too should be made clearly.

Part of our problem though is entirely practical: more subscribers means more money to pay for larger and fatter issues of the magazine. And at present, we're running as many pages as we can afford. What's more, no magazine can make money without advertisers; and our existence is predicated on a (more or less) 50/50 balance between ads and editorial in each issue. When there aren't enough ads, we can't run enough editorial pages to provide the range of coverage that we'd like. More advertising and more subscribers mean more editorial; that's a fact of magazine publishing life, I'm afraid.

But we're going on to the bookstalls in February, and that should attract both more readers and more advertisers – so during 1984 we should be producing larger issues. Large enough, hopefully, to cover *all* (or at least more) of the subjects that we want to include and the readers' needs that we want to meet.

Thanks for writing, anyhow. We don't get enough constructive criticism – most of our post consists of individual queries, and it's difficult to get any idea at all of how the magazine is performing unless we hear from readers. So keep writing: we need all the critics and all the ideas we can get!

On the other hand ...

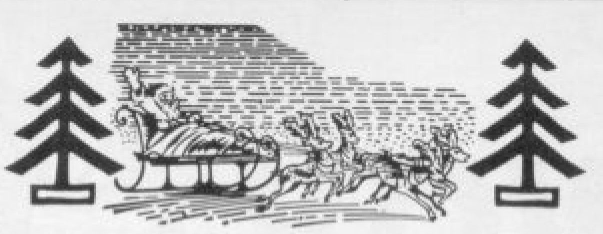
Congratulations on Issue 1 of the new **Commodore User** magazine. It displayed much evidence of sound thinking behind the scenes. I am sure that the new format will appeal to Pet, Vic-20 and 64 enthusiasts alike.

May I be permitted to comment on the *Punters Progress* review of two of my programs by J.D. Collins. The comments and four-star rating for *Home Office* was, in the main, very fair and well presented. However, I feel that Mr. Collins was a trifle unfair on "the limitation of cassette as opposed to disk for this kind of application". Both VICPRO and VICDATA have full Vic-1540/41 disk handling routines within the programs – including Disk Directory and the facility to overwrite an existing file.

The fact that the two programs within *Home Office* are marketed as a cassette tape holds the price down to a reasonable level – ie £12.95. They are 'open' programs and not protected by any secret dodge to prevent a purchaser from gaining access to the listing. They may easily be saved to disk, with the consequent advantage of quick loading and instant access to files and documents.

One final comment. Mr. Collins' recommendation that *Home Office* would be good – "for letters to pen friends or thank-you notes to Aunties ... lots of uses – but at a domestic level". Mr. Collins kindly pointed out that this was not meant as a put-down: but you may be interested to note that as a professional writer I have been using VICPRO for writing BBC television scripts for over a year.

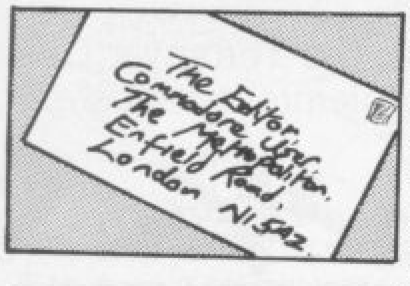
Letters





The Commodore 64 version of *Home Office*, with an integral Centronics interface for Epson Printers is due out about now. It too has full disk handling routines and 'open' access.

Bob Saunders, Navajo Productions, 26 Strathmore Drive, Charvil, Reading, Berks. RG10 9QT.



And again (sort of)

I see that *Vic Computing* has been replaced by **Commodore User**. As the owner of a Vic-20 I wonder what use **Commodore User** will be to me. There seems to be little of relevance to me in your first issue.

Please tell me where I can write to obtain a catalogue of software for the Vic-20 and if there is a programme for learning to *type* programs on the Vic. I also hoped to obtain a dust cover but have no idea where to write.

It begins to feel like a big mistake not having bought a 64, except that at the time (last Christmas) we were promised more that has been delivered.

Mrs. Gilchrist, Alpele, Broomfields, Hatfield Heath, Bishop's Stortford, Herts. CM22 7EH.

Nothing for Vic? That issue divided almost equally in terms of editorial articles between items specific to the Vic, stuff specific to the 64, and 'common' material which applies equally to the two.

Software for the Vic? Well, many of our advertisers do extensive catalogues – the biggest is probably Audiogenic's, but most of the program vendors do mail order lists. Apart from that, there's Commodore's own offerings – and its *Vicsoft* catalogue (call 0752 74111 for a copy). And the Vic/64 dealers stock software; the bigger the dealer, of course, the wider the range.

Programmes for programs? Presumably this means a 'teach yourself' course, in which case the best one we've seen for the Vic is undoubtedly Commodore's own *Introduction to Basic Part 1* (to be followed when interest and finances permit by *Part 2*).

Dust covers? Well, you could but ours (see the IN STORE catalogue in this issue). Or alternatively try the ads – candidates include Stack, Chromasonic, Alphatronic and others.

False promises? Maybe. But not from us ...

Rip-offs?

I am writing to you in connection with the program *Sheepdog* published in the October edition of **Commodore User**.

When I saw this program I felt that it was rather familiar; so I checked the March 1980 edition on *Practical Computing*, wherein I had published a *Sheepdog Trial* program and article under the title "In pastures phosphor green". In the article I had given full details of the structure of the program, written for the Pet 2001, and hints of converting it for other machines.

It is obvious that the program you published is such a conversion for the Vic, a little simplified to allow for the memory available and the different screen size. Nevertheless, large areas of the program are virtually unchanged save for different screen POKE locations.

In publishing a program in a magazine I am obviously encouraging all home computer users to adapt it to their own machines. I do not object to these conversions being published for other users. But I *do* object to such conversions being passed off as original programs.

I would ask your contributors to include in their articles some acknowledgement of their source. In two of the games I have published, I based ideas directly or indirectly on proprietary board games. The source of my inspiration was fully acknowledged in the articles that accompanied them. Where there is an even closer relationship to another person's work, it must surely be acknowledged.

Bob Merry, 6 Birkdale Close, Bramhall, Stockport Cheshire SK7 2LN.

We'll give the 'author' of *Sheepdog* the benefit of the doubt – we haven't been able to contact him before we went to press – and restrict our comment to this: GIVE DUE ACKNOWLEDGEMENT WHEN YOU SHOULD. OK?

Competition

"Supersoft reckons it's first with a 6502/6510 assembler for the 64".

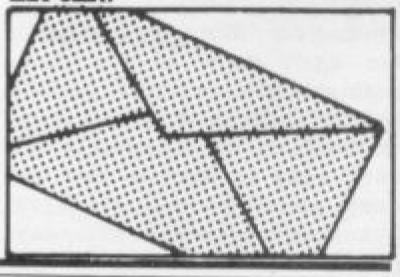
Stack claims the prize for being the first with *two* assembler/disassemblers for the 64!

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SUPER HELP is already being acclaimed as one of the best products available for the 64. Designed for disk-based systems, it again offers a full symbolic two-pass assembler, a disassembler, machine code monitor, toolkit commands, and a disc operating system support. All this on one cartridge for £35 plus VAT.

I hope we take the prize!

N. Cornes, Dealer Sales, Stack Computer Services Ltd, 290-298 Derby Road, Bootle, Liverpool L20 8LN.



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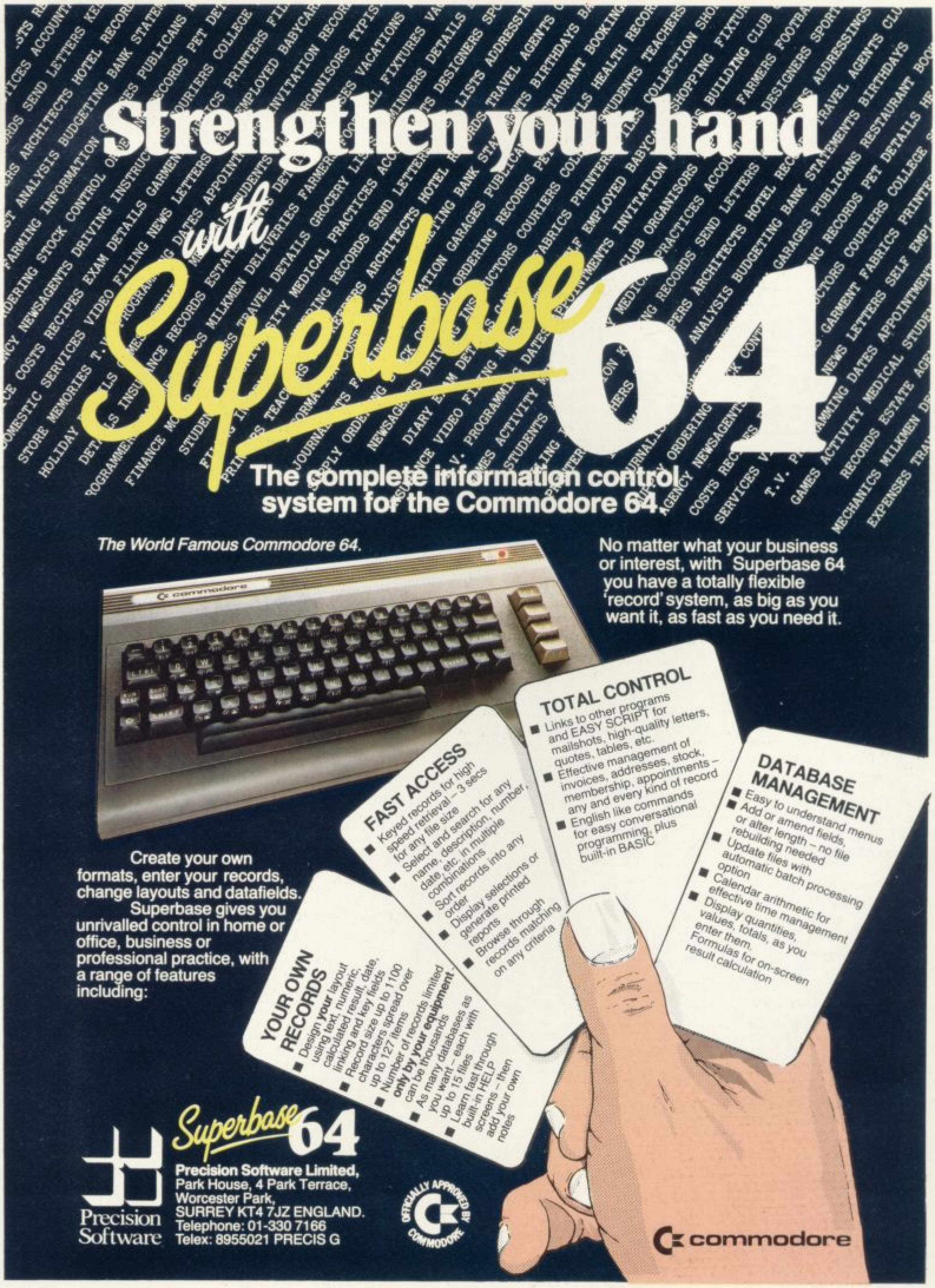
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